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ABSTRACT

The revised guide, prepared to supplement the existing curriculum, suggests activities related to the three student goals: (1) to develop an awareness of who he/she is, and, through effective decision making, what he/she can become; (2) to become aware of the interrelationships of society with his/her school, community, family, work, and leisure; and (3) to become aware of the many facets of the world of work. A definition of career education and an outline of 10 junior high career education concepts open the document and are followed by steps for study. Suggested activities and procedures are presented for the following two subject areas and their related units: mathematics (general business, geometry, metrics, fine arts and humanities, graphic arts, consumer and homemaking education, business and office education, forestry, hotel and motel management, personal service occupations, marketing and distribution careers, and environmental careers) and science (work and machines, general science, meteorology, geology, astrology, botany, ecology, and biochemistry). Objectives, teaching procedures, and resource materials are presented for each unit. A 14-page list of suggested local field trip sites and guest speakers is included. (BP)

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CAREER EDUCATION

Learning with a Purpose

JUNIOR HIGH 7-9 VOL. 4

- Mathematics
- Science
- Field Trip Sites and Guest Speakers

CE006365

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During 1974 and 1975 in career education workshops, a group of teachers from three counties (Saline, Pettis and Benton) in central Missouri developed these activity guides. Special appreciation is expressed to all those individuals who participated in this program.

This booklet is only one step in the direction of developing career education curriculum. It has been revised and will continue to be reviewed and tested as an instrument for use as infusion of career education activities in middle/junior high levels of school.

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FOREWORD

This guide has been prepared with the hope that the following activities will be useful in infusing career education programs in an existing curriculum. The activities presented relate to the three general career education goals set up by the workshop participants for the junior high/middle school level. They are:

For the student

(1) to develop an awareness of who he/she is and through effective decision-making what he/she can become;

(2) to become aware of the interrelationships of society with his/her school, community, family, work, and leisure;

(3) to become aware of the many facets of the world of work.

All objectives, goals and activities included in this guide were developed in relation to these general goals.

The activities which follow are offered as suggestions for supplementing activities in career education programs. This guide's purpose is not to tell the individual instructor what he or she must do. Rather the guide simply offers an example of what the teacher might do. Exactly how the instructor does this will depend upon the interests, talents, abilities and ingenuity of the specific teacher, the students, and the resources available.

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CAREER EDUCATION
DEFINITION AND DESCRIPTION

There has been a saying used for many years that education is preparation for life. At different points in our nation's history, this point has been overlooked or overshadowed by other interests. It would seem that career education is purposely trying to once again provide this type of education.

Career development, which is a lifelong process, begins at a very early age. Even the pre-schooler does role playing. As a child enters formal education, he should continue a step known as the Awareness Stage. This usually covers pre-school through grade six. The second is the Exploration Stage, which covers the middle or junior high level. The third is the Preparation Stage. This covers a time period as long as necessary for the individual to acquire the skills and knowledge needed to enter and progress through his occupational career.

The educational climate today indicates a growing awareness on the part of increasing numbers of people that living in the most advantageous vocational niche is one of the most critical of cultural aspects to man and society. This is the climate that has given impetus to the concept of career development. The great scientific and technical advances in our country have brought about the age of automation--an age in which every person is a specialist. This is true of both the college-educated person and the worker who terminates his education with graduation from high school. Virtually every person, man or woman, college student or not, is involved in earning a living. Education, then, should provide meaningful, significant experiences designed to equip the individual for work in which he will be successful and properly challenged in accordance with his specific aptitudes, interests and total personality. In the case of these individuals who will eventually graduate from college, the function of the school is an interim step. For many others, high school may be the only formal preparation for a lifetime of work and living.

Career education says: Each individual should be led to develop his own work values after becoming fully aware of the alternatives and the implications, rather than have them dictated.

"Career" itself is a confusing term. To us, it refers to the sum total of all the work done by a person in his lifetime. It differs from an occupation in that an occupation is a component of a career at a point in time.

Career education, then, attempts to help students understand the work ethics imposed by society; develops their work values based on their own personal interests in full awareness of society's demands; helps them become aware of the world of work and its values, prepares for, and ultimately begins and pursues a career, including the possibility of occupational change and the hope for productive use of leisure during that career.

PHILOSOPHY

The interests of the junior high school revolve around the home, school and peer group. Through study of society, self and the world of work, these students begin to see themselves as an integral part of a working whole. Career education brings relativity to the classroom as it seeks to give the students a firm foundation in the basic skills of education.

CONCEPTS

1. Explore and become aware of the many kinds of careers available.
2. Realistically appraise career selections according to his present abilities and interests.
3. Understand that each person is an individual with different capabilities, needs, interests and values.
4. Recognize the value and interdependence of each job choice.
5. Realize that work in school is directly related to future job success.
6. Realize the satisfaction that should be inherent in job choices and in leisure time pursuits.
7. Realize that the cultural and social attitudes of his heritage will not necessarily limit his job choice.
8. Realize that the world is in constant change just as his own abilities, interests and aspirations change and will, therefore, explore many occupational possibilities during his maturation process.
9. Appreciate the responsibility he has to use his potential to contribute to the work force and to wisely use his leisure time to better the standards of cultural and recreational pursuits of his society.
10. Career preparation is not limited to a study for a specific career but necessarily includes all areas of study that broaden his mind and expand reasoning power so that he can make suitable choices in all phases of adult life.

STEPS FOR INTEGRATING CAREER EDUCATION

CONCEPTS INTO UNITS OF STUDY

Select a unit that you will be teaching from your content area.

If necessary, further divide the unit into sub-units of 5 to 10 days duration.

Before a teacher can integrate career education into his content, he must first know the teaching purpose of his unit or sub-unit. Write in a declarative sentence what you want your students to know after you finish teaching the unit or sub-unit. This is the major idea.

Select a career objective from any of the five areas that you could incorporate into the unit mentioned above. State it as a major idea so that it can be combined with the content major idea.

Now you may incorporate the career education ideas into your unit in one of three ways.

a. Rewrite the content major idea to include the career education objective. If you do this, then your teaching unit will be primarily career oriented.

b. Keep your original content major idea. All components may not have career implications. If you have listed four components, three may be strictly content oriented. The fourth component may be the only one that has career implications. If you do this, you will have at least one lesson devoted to career education.

c. Your major idea and your components may have no stated implications. You will bring out the career implications in the activities you use for each lesson or component.

List the components that you will need to teach in order to get your major idea across to your students. A component is a word or phrase which will develop into a lesson.

Take each component and write a learning objective for it. The learning objective should tell what you expect the student to be able to do when he has finished the lesson.

For each component or lesson, list the learning activities that you would have your children do.

Subject Area(s) Math

Unit(s) General Business

Objective(s):

To familiarize the students with check writing.

Procedure:

Show the students, with the overlay, a blank check. Explain the lines and markings of the check, date, recipient of check, two lines for amount, and signature line. Show and explain the bank's codings.

Supply the student with five blank checks. Give them enough information to fill out each check properly.

Resources and Materials:

Sample checks

Overlay of check

Evaluation:

Look over the checks to see if filled out correctly.

Comments on use:

The amount may be written differently. You may show the differences or choose one for a model. Example: Four and 35/100_____, Four and _____35/00 Four 35/100_____

Kerry Vitkus

Subject Area(s) Math

Unit(s) General Business

Objective(s):

To familiarize the student with balancing a check book.

Procedure:

Present a sample balance sheet to the students showing the columns for check number, date, check issued to, amount of check, date of deposits, and balance. Show how to fill in each column for each check and deposit.

Explain service charges and how to calculate amount charged each month.

Supply each student with a balance sheet with a balance amount. Each student should have a different amount. Give them enough information to figure a balance sheet for two deposits and about 5 to 10 checks.

Resources and Materials:

Overlay or laminated cardboard of balance sheet
Balance sheets for each student
Worksheet with deposits and checks

Evaluation:

With each student having a different starting balance, you could have them exchange balance sheets to check for errors. This gives each student more exposure.

Comments on use:

Original balances may be the same or different. This is left to the teacher's discretion.

Kerry Vitkus

Unit(s) General Business

Objective(s):

To familiarize the student with a personal and family budget.

Procedure:

Have the student write on a sheet of paper the amount of money he or she gets a month for allowance and/or earnings. Have them list their monthly or weekly expenses such as clothes, school supplies, church, food, or any other expenses unique to them.

Have them keep a list for one week to show every expense made that week. The list should include the date, what the money was used for, and the amount spent.

Have the students, at the end of the week, compare their expenses with the estimated ones. Have them write how they could more wisely spend their money.

Resources and Materials:

Textbook if available

Evaluation:

Keep the first paper with the students estimated weekly expenses and have the students check them with the actual week's expenses.

Comments on use:

For students with no income, give them a ficticious amount of money so they can keep record of what they would spend if they had the money.

Kerry Vitkus

Subject Area(s) Math

Unit(s) General Business

Objective(s):

To familiarize the student with a personal and family budget.

Procedure:

Have the students set up a budget comparing it to the weekly record they keep. Have them include a 10 percent savings.

Have the students keep a record of the next week's earnings according to their written budget. At the end of the week, have them check to see how close they stayed within their budget. Have them make any corrections to their budget as needed.

Have the students bring in their family budget, if one is used. Write on the board the type of things that consist in a family budget such as rent or mortgage payment, utilities, food, phone bills, charge accounts, car loans, etc.

Have the students rework their family budget so as to have a savings program if one is not already established. If a student's family does not have a budget, have him work with his parents to establish one.

Resources and Materials:

Textbook if available

Chalkboard

Evaluation:

Check with each student's expenses and budget to see that it is workable. Classroom discussion. Compare remade budget with established one or check budget of students whose families do not have a budget.

Comments on use:

A letter should be sent home to parents to assure them you are not invading into their privacy but using their family budget as a learning experience for their children.

Kerry Vitkus

Subject Area(s) Math

Unit(s) General Business

Objective(s):

To familiarize the student with a personal and family budget.

Procedure:

Supply the students with a monthly income for a family of a specified size and have them set up a budget for the family.

Give them a surprise added expense for the month such as a car repair bill and have them work it into the budget.

Supply them with checks and balance sheets to make the monthly payments.

Resources and Materials:

Worksheet having the income and amounts for rent and all bills for the month.
Checks
Balance sheet

Evaluation:

Check to see if bills can be paid and if the budget is workable.

Comments on use:

Kerry Vitkus

Subject Area(s) Mathematics

Unit(s) Percents & Interest

Objective(s):
To show the students how banks and loan companies work.

Procedure:	Resources and Materials:
During the unit on percents and interest, find out how many students have savings accounts and if they know how they work.	A local bank or loan company Sample savings account books Interest sheets
Find out how many students' parents have loans or credit cards. See if the students know how much it costs to use a credit card or to take out a loan.	Applications for loans Play money Stations for cashiers windows (Desk or refrigerator boxes)
Take the students to a bank or loan company or bring a representative into the class to explain how their business handles loan and savings accounts. A company such as Sears could be called upon to talk on charge accounts.	Adding machine or small calculator are optional.
Have the students set up a classroom bank with tellers, loan consultants, and accounting personnel. With advice from a bank official or with his direct supervision, have the students use play money to start savings accounts and to take out loans. The other students will then be figuring interest on the loans and savings.	

Evaluation:
A classroom discussion on what was learned during the activity should be conducted to see if the students had learned the functions of banking institutions.

Comments on use:
The activity could be done over a two or three class periods to concentrate on each aspect of banking per period. Causes and reasons for borrowing money could be added to this activity so that the students will know the qualifications needed for a loan.

Kerry Vitkus

Subject Area(s) Mathematics

Unit(s) Geometry

Objective(s):
To show the students how geometric shape are used and seen in our everyday lives.

Procedure:
When introducing geometry, have cardboard replicas of the shapes to be studied for plane and solid geometry.

Have the students list or suggest for a common list things in everyday life that have these shapes.
Examples to start the discussion might be as follows:
Plane figures
1. a bill board for a rectangle.
2. a yield sign for a triangle.

Solid figure
1. a cereal box for a rectangular solid
2. a glass for cylirder.

Resources and Materials:
Textbook

Cardboard figures
Home objects such as cereal boxes
Magazines for the students to find pictures with geometric shapes

Evaluation:
Class discussion with no grade.

Comments on use:
A poster or bulletin board could be made by the students to show geometric shapes.

Kerry Vitkus

Subject Area(s) Mathematics

Unit(s) Geometry

Objective(s):

To use geometric shapes for an art related project.

Procedure:

Have the student chose one or more geometric shapes such as a circle, triangle, and/or square. Using the appropriate instruments, produce the chosen shapes on the cardboard. Mark off the drawn lines equally, 1/4 inch is an easy unit. Punch wholes at each mark along the lines with the needle. With threaded needle, sew through the wholes so that the thread crosses over the front of the cardboard. To make the design completed, the student must go in or out of each whole twice which forms an angle at each whole.

Resources and Materials:

Cardboard--lightweight such as from panty hose packages.

Colored thread
Needles
Tape
Ruler, compass & protractor

Evaluation:

The assignment could be evaluated on neatness as well as complexity of design.

Comments on use:

To make a neater design and to use less thread, have the students had thread on front of cardboard.

Kerry Vitkus

Subject Area(s) Mathematics

Unit(s) Geometry (sets of points & plane figures)

Objective(s):

The student will understand:
the sets of points is geometry known as point, line, line segment, and plane.
the intersection of these sets of points.
the plane geometric figures, especially the triangle and quadrilateral.

Procedure:	Resources and Materials:
Briefly review Sets.	Textbook
Define and discuss the following sets of points: point, line, line segment and plane	
Give common examples of each and have students give examples.	Classroom, building, common knowledge
Examples: Point--a period dots in news photo, etc. Line--railroad rail light or telephone wire Line segment--edge of desk needle free throw line Plane--floor, celing, or walls of room desk top, etc.	

Evaluation:

Students should adequately define the above mentioned sets of points. They should also be able to give an example comparable to each and be able to classify examples of each.

Comments on use:

This is rather simple material, basically an introduction, but should stress the fact that these sets of points have no dimensions, except length, and therefore cannot truly be compared to tangible objects.

David Steele

Subject Area(s) Mathematics

Unit(s) Geometry

Objective(s):

The student will understand what set of point(s) is/are formed by the intersection of the afore mentioned sets of points.

Procedure:	Resources and Materials:
Ask students to explain the term "intersection." Then give the definition as it pertains to mathematics. Also give a mathematical definition of intersection, this is Xe(anb) if Xea and Xeb.	Textbook
Have students give examples of "intersections" found in daily situation.	Surroundings and common knowledge
Then define the following: 1. intersection of 2 lines. 2. intersection of 2 planes. 3. intersection of 3 planes. 4. intersection of line and plane.	
Examples of intersection of sets of points: for 2 lines--the actual intersection of two streets for 2 planes--the edge formed by the intersection of the floor & walls, ceiling and walls, or two walls of the room. for 3 planes--the corners of a room formed by intersection of ceiling and two walls or floor & two walls. Also, an axle with spokes or fins, where the spokes or fins represent planes.	The classroom

Evaluation:

Comments on use:

Unit(s) Geometry

Objective(s):

The student will understand the difference between two sets of points that do intersect and those that do not intersect.

Procedure:

Give an explanation of parallel lines.
Give examples, i.e., railroad tracks.

Give explanation of parallel planes.
Give examples, i.e., floor and ceiling.

Give explanation of parallel lines and planes.
Give examples, i.e., wall and a seam in the chalkboard.

Resources and Materials:

Natural surroundings

Evaluation:

Comments on use:

Students tend to forget that lines and planes extend indefinitely in length and they (the students) try to bend these in order to form situations that do not actually exist.

David Steele

Subject Area(s) Mathematics

Unit(s) Proofs

Objective(s):

To understand the commutative, associative, transitive, and distributive properties and to be able to apply these in doing some simple proofs.

Procedure:

Review the commutative, associative, and distributive properties.

Lecture on what a Proof actually is. Give the two basic parts to every proof:
Statements & Supportive Reasons

Stress that in a proof, every statement must be supported by a sound mathematical reason. Demonstrate some simple proofs such as:

PROVE: $a + (b + c) = (c + a) + b$

Proof:

Statements	Reasons
$a + (b + c) = a + (c + b)$	Comm. of Add.
$a + (c + b) = (a + c) + b$	Assoc. of Add.
$(a + c) + b = (c + a) + b$	Comm. of Add.
$a + (b + c) = (c + a) + b$	Transitive

Resources and Materials:

Textbook

Evaluation:

Comments on use:
This same procedure would be excellent for a geometry class.

David Steele

Subject Area(s) Mathematics

Unit(s) Proofs

Objective(s):

Procedure:

Have mock court room procedures.

Have one student act out the judge. He will call the court to order and have control over the proceedings.

Designate some students to act as a jury. Their responsibility will be to decide if a proof was done correctly. Designate some students to be lawyers. Defense Attorney: Their job will be to supply the "reasons" for each statement the client makes. Prosecuting Attorney: Their job is to try to find any mistakes or fallacies in the defense's proof. Designate certain students to be "on trial." They will be allotted five minutes with their lawyer to prepare their proof. The prosecuting attorney will be given the same proof so he can review it and look for probable mistakes. Judge calls court to order and reads the proof to be proven to the jury. Defendent puts proof on board, one step at a time. The lawyer must supply the reason. After each step in the proof the prosecuting attorney is allowed to question that step and its reason. If the prosecuting attorney can find nothing wrong with proof, the defendent stands acquitted. If a mistake is minor, the jury may overlook it and acquit the defendent. If the jury decides the proof was wrong, the defendent will be found guilty and will be assigned the proof for homework.

Resources and Materials:

Evaluation:

Teacher can accept jury's decision or overrule it. A test should also be given over this material.

Comments on use:

Teacher will have final say as to whether a proof is valid or not and can override the judge and jury.

David Steele

Subject Area(s) Mathematics

Unit(s) Ratio

Objective(s):

The student will:
understand what a ratio is.
be able to recognize a ratio.
be able to set up ratios.

Procedure:	Resources and Materials:
Lecture on what constitutes a ratio.	Text
Have students set up ratios from word problems in text.	
Have students make up some ratios of their own. Example: $\frac{\#\text{ of students}}{\#\text{ of students who live on a farm}}$	
Have students collect or reproduce examples of ratios they have seen or heard.	Newspapers, magazines, radio, television, etc.
Have students compare their ratios. Then determine if any of the ratios have the same value, yet are written differently. (An introduction to proportion)	

Evaluation:

Students will be able to demonstrate their knowledge of ratios by successfully setting up ratios from raw data.

Comments on use:

David Steele

Subject Area(s) Mathematics

Unit(s) Proportions.

Objective(s):
Overall Objectives for Ratios and Proportions:
Students will understand ratios and proportions and will be able to determine "better buys," and should be able to indirectly measure inaccessible objects.

Procedure:	Resources and Materials:
Lecture on proportions.	Text
Have students solve many proportion problems.	
Lecture and assign homework on determining which of two ratios is the smallest and which is largest.	
Have students bring in labels or prices from groceries for any type of salable items. Have them compare the "price per unit" of different brands and different quantities to determine the better buy.	Family food labels, newspaper sale ads.

Evaluation:

Three different overall evaluations: Students should successfully:
pass a written exam over ratios and proportions.
demonstrate competency in applied consumer purchasing.
demonstrate competency in applied indirect measurement.

Comments on use:

David Steele

Subject Area(s) Mathematics

Unit(s) Proportions

Objective(s):

To supplement work done by students on comparing ratios by setting up proportions.

Procedure:

Give the students a shopping list of certain items to buy. Have them purchase a specified minimum amount of each item. Example:

at least 30 ozs. of cereal
at least 10 lbs. of sugar

Each student will "be given" the same amount of shopping money. Those who purchase the items and have the most money left would indicate they know how to compare two ratios by setting up proportions.

NOTE: No financial transactions should actually be allowed.

Resources and Materials:

This could be done two ways.
1. Have students actually take list to grocery stores and write down the different "price per unit" of different brands and different quantities of the same product.

2. Set up a mock store in the classroom with empty boxes and cans as the products. These could have their original prices listed or mock boxes and prices could be made up.

Evaluation:

The students who purchase the required items and also have the most money remaining would understand the concept of proportions the best. This could serve just like a test.

Comments on use:

This could also be introduced in budgeting or budgeting could be introduced here.

David Steele

Subject Area(s) Mathematics

Unit(s) Proportions

Objective(s):

Students will be able to apply their knowledge of proportions by measuring objects indirectly through the use of similar triangles.

Procedure:	Resources and Materials:
Lecture on similar triangles and how they may be used to measure objects that are not easily accessible. (Must get this basic concept across to students very soundly)	Text
Have students actually measure the heights of things such as flagpoles, buildings, trees, telephone poles, etc., by using similar triangles. (Advanced groups might be able to measure distances across lakes, swimming pools, streams, streets, gymnasiums, etc.)	Nearby objects or structures

Evaluation:

Students will demonstrate application of their knowledge of proportions by successfully measuring the height of an inaccessible object.

Comments on use:

Should be careful on the extent of application. This is because it borders on geometry and may be too advanced for this age level.

David Steele

Subject Area(s) Mathematics

Unit(s) Triangles

Objective(s):

To be able to classify some simply polygons.
To be able to classify different types of polygons known as triangles.

Procedure:

Define polygon.

Give examples of polygons as evidenced in some common objects, i.e., stop sign, dominos, musical triangle, etc.

After discussing polygons, have students draw the simplest polygon they can. This would be a triangle.

Give students the different types of triangles.

Classification by Sides	Classification by Angles
Equilateral	Equiangular
Isosceles	Acute
Scalene	Right
	Obtuse

Resources and Materials:

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Triangles

Objective(s):

Procedure:

Have students use small objects such as pencils, straws, or match sticks of different lengths and have them construct each of the different types of triangles.

Have students locate the different types of triangles in architecture, construction, painting, and sculpture. This could be done independently or as a group on a field trip.

Resources and Materials:

Any type of small objects, pencils, matchsticks, etc.
Also need a ruler and a protractor to make sure the triangles constructed are constructed correctly.

Any buildings, houses, particularly very modern or Greek or Gothic type buildings or houses.
It would be best if an art museum could be visited to view paintings and sculptures. If this is not readily available, they could simply bring periodicals to school and cut out pictures that contain the different types of triangles.

Evaluation:

Comments on use:
There's no need to dwell on this activity, but I think the students will be surprised to discover that all architecture, construction, art, etc., is constructed of very simple geometric forms.

David Steele

Subject Area(s) Mathematics

Unit(s) Quadrilaterals

Objective(s):

To cover quadrilaterals to the extent that students will be able to classify any type of quadrilateral. An introduction to the "if, then" statement and how it applies to classification of quadrilaterals.

Procedure:

Define quadrilaterals or quadrangles.

List and draw the six types of quadrilaterals.

Ask students to divide these six figures into two groups by any classifications they desire.

The classification should be:

Parallelograms	Non-Parallelograms
Square	Trapexium
Rectangle	Trapezoid
Rhombus	
Rhomboid	

Have students construct these six different quadrilaterals. This should be done with both actual objects, such as match sticks, and also with ruler and protractor.

Introduce the "if, then" statement. Give some examples such as:
"If I finish my homework then I can go to the movies."
"If it doesn't rain then we will go fishing."
Ask students to give examples of the "if, then" statement.

Ask students what occupations would use the "if, then" statements quite often. Actually nearly

Resources and Materials:

Textbook

Ruler
Protractor
Small objects such as pencils or match sticks

Evaluation:

Comments on use:

Subject Area(s) _____

Unit(s) _____

Objective(s):

To determine if an "if, then" statement is true or false, and why it's true or false.

Procedure:

everyone would use these statements, but some conspicuous ones are a computer programmer, a lawyer and anyone in a position of responsible decision-making.

Give students statements similar to those listed below and have them indicate whether the statement is true or false.
Example: If a quadrilateral is a rectangle, then it is a square. (False)
"If a quadrilateral is a square, then it is a rectangle." (True)
"If a quadrilateral is a rhomboid, then it is a rhombus." (False)

Ask students to explain their answers to the above questions. Explain how people often use an "if, then" statement incorrectly.
Example: "If you went fishing but did not catch any fish, then you did not enjoy yourself."
"If then" statements should be used to represent only facts and no assumptions should be made.

Resources and Materials:

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Quadrilaterals

Objective(s):

To subdivide quadrilaterals into subgroups beyond that of parallelograms and non-parallelograms.

Procedure:

Have students explain the difference between a square and a rectangle. Also explain difference between a rhombus and a rhomboid.

Stress the fact that the square is a specific type of rectangle and that the rhombus is a specific type of rhomboid. This should make the "if, then" statements over quadrilaterals much easier.

Return to daily examples of "if, then" statements and introduce the term fallacy and discuss how fallacies are used to deceive consumers and to make false proofs.

Resources and Materials:

Evaluation:

Students should be able to classify quadrilateral figures. They should also be able to classify these figures just from a written or verbal description.

Comments on use:

David Steele

Subject Area(s) Mathematics

Unit(s) Graphs

Objective(s):

The student will better understand what constitutes a graph and what different types of graphs exist.

Procedure:

Lecture and class discussion on graphs

Have students bring in actual graphs from newspapers, magazines, and other sources. Have students bring in a. circular graphs
b. bar graphs
c. line graphs

Discuss what the individual graphs refer to and how they are (or can be) employed by different careers.

Resources and Materials:

Textbook and personal knowledge

Newspapers, periodicals

Evaluation:

Students will be able to correctly classify different types of graphs.

Comments on use:

David Steele

Subject Area(s) Mathematics

Unit(s) Graphs

Objective(s):

The student will learn to interpret graphs and will also be able to organize raw data.

Procedure:	Resources and Materials:
Have students bring in graphs and/or give them copies of pre-drawn graphs. Then have them interpret the graphs.	Newspapers, periodicals, math books, science books
Give the students raw data and have them construct an appropriate type of graph that represents the given data.	Any type of raw data i.e.: grades, crime, marriages, divorces, murders, barometric pressure, prices, boiling points, solubility, rainfall, snowfall

Evaluation:

Students will be able to correctly interpret and construct graphs.

Comments on use:

There is an endless variety of ways to graph the raw data. Example: Prices vs. Different Gas Stations, Prices vs. Different Chain Stores, Prices vs. Seasons of Year, Prices vs. Different Brands of Soups, Wines, etc.

David Steele

Subject Area(s) Mathematics

Unit(s) Graphs

Objective(s):

To realize how useful and persuasive graphs can be.

Procedure:

Class discussion on how persuasive and helpful well-constructed graphs can be.

Let students write two short reports after collecting their own raw data. One report should use only words to try to get a point across. The second report should try to get the same basic idea across, but it should employ the use of an appropriate graph.

Then have students read each others reports and see which report is easiest understood.

Resources and Materials:

Newspapers, periodicals, technical reports, term papers, thesis

Evaluation:

Student will read both reports of another student, but after reading each report he will write down what he thinks the report was trying to say.

Comments on use:

This is especially important in term papers, thesis, and in reports to employers.

David Steele

Subject Area(s) Math

Unit(s) Probability

Objective(s):
To introduce probability to the students.

Procedure:

As the students are studying probability, have them take a penny and toss it 100 times and record heads and tails after each toss. Take the total from the entire class to see if the probability is close to 1/2.

Take the marbles in a bag or a box and have each student pull one, record the color, and replace the marble. Go around the room until you have either 50 or 100 tries recorded. Check to see how close the probability is to 1/2.

Class discussion on occupations that involve probability, i.e., actuarial science, insurance programs and rates and statistical calculations.

Resources and Materials:

Pennies
100 marbles, half one color, half another (ten may be used)

Evaluation:

Classroom project, no grade

Comments on use:

Colored paper of equal size could be replaced for marbles.

Kerry Vitkus

Subject Area(s) Math

Unit(s) Bases

Objective(s):

To familiarize the students with base numbering systems.

Procedure:

After students have been introduced to base two and base five, have them choose a base less than ten other than two or five.

Have them write from one to one hundred in their base.

Have them show place value and the process for changing from base ten to their base and from their base into base ten.

Have them show examples of addition, subtraction, multiplication and division in their base.

Explain that computer science is set up on base two and how the relationship is derived. Discuss computer programming as an occupation.

Resources and Materials:

Any textbook chapter dealing with bases

Evaluation:

Check calculations and conversions.

Comments on use:

This could be an exercise for only your advanced students as it may prove difficult for the slower student.

Kerry Vitkus

Subject Area(s) Math

Unit(s) Bases

Objective(s):

To supplement math bases activities with a Math Bee using base two and base five.

Procedure:

Divide the students into two teams. Have one student go to the board from each team.

Orally give a problem for the two students to put on the board and work. The first person to correctly finish the problem scores a point for their team.

The problems should be average in difficult--addition and subtraction problems in the two bases.

Resources and Materials:

Chalkboard and chalk
Problems in base two and base five

Evaluation:

The team with the most points at the end of the game is the winner.

Comments on use:

Kerry Vitkus

Subject Area(s) Mathematics

Unit(s) Metrics

Objective(s):

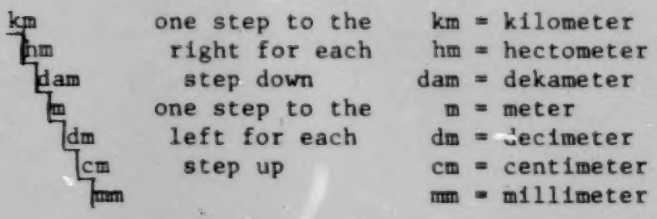
The students will be able to change from one unit of measure using a "Stair Step" model.

Procedure:

The students will be shown the units in the Metric System have a difference of a power of 10. Such as 1 meter is equal to 10 decimeters and 1 meter is 1/10 of a dekameter.

The students will be introduced to the names of the linear units from kilometer down to millimeter.

They will be shown the "Stair Step" and shown the direction the decimal point moves for each step. (One for each step up or down)



Resources and Materials:

Chalkboard or overlay and worksheet

Evaluation:

A worksheet will be given with problems to interchange one unit of measure to another using the Stair Step. Such as 15 m = ___ cm, which is two steps to the right of 1500 cm.

Comments on use:

Each time have the students remake the Stair Step for each worksheet.

Kerry Vitkus

Subject Area(s) Mathematics

Unit(s) Metric (liter)

Objective(s):

To introduce the student to the metric unit of measure, liter.

Procedure:

Show the student the length of one decimeter. Explain that the liter is based on this unit. Show a container that is a cubic dm. Tell the students that one liter is the same as $1dm^3$ and show them this by filling one container of water into the liter cylinder.

Explain capacity to the students. Show them that for capacity of objects use the liter.

Show the students that the stair step can be used for liters also. Place the prefixes for each unit on the stair step and replace the m for meter with an l for liter. Show that conversions are done the same for liters as for meters.

Resources and Materials:

A cubic dm container
A liter cylinder
Chalkboard or overlay for stair step
Worksheet for problems of conversions in lister if desired.

Evaluation:

Check worksheet if given.

Comments on use:

One cubic decimeter of water is only equal to a liter of water at a certain temperature and atmospheric pressure so some allowance or explanation may have to be made.

Kerry Vitkus

Subject Area(s) Mathematics

Unit(s) Metrics (linear)

Objective(s):

To familiarize the students with the meter stick and the divisions of the meter stick. The students will become familiar with the terms and quantities of meter, decimeter, and centimeter.

Procedure:	Resources and Materials:
Show the meter (m) stick. Show that it is similar in length to a yard stick. Be sure to use the term meter stick instead of yard stick.	Meter stick and stick showing decimeters (10) and centimeters (10).
Show the decimeter stick. Show that there are 10 decimeters (dm) in one meter by putting the 10 decimeters end to end next to the meter stick. Do the same with the centimeters (cm).	Students should have equipment to use or share between two or three.
Give students problems such as 30 dm = ____ m and 30 dm = ____ cm to familiarize them with the interchangability of the units.	Worksheet

Evaluation:

A worksheet will be provided with problems as stated in (3) above.

Comments on use:

Kerry Vitkus

Subject Area(s) Mathematics

Unit(s) Metrics (linear)

Objective(s):
The students will be able to use a meter stick and tape measure to find the measurements of common objects.

Procedure:

The student will be asked to measure his desk, length and width to a certain unit such as centimeters (cm). They will then be asked to find the perimeter of the desk using his figures. He will then change these to decimeters and meters using the previously established knowledge of multiples of ten.

Students will work in groups of two or three to measure prescribed articles in the room. These measurements will be changed into different units.

Resources and Materials:

Evaluation:
Worksheet will be checked to see if measurements were done accurately, allowing for human error and object measured. Calculations will be checked in the conversion to other units, ex. dm to cm.

Comments on use:

Kerry Vitkus

Subject Area(s) Mathematics

Unit(s) Metrics (Square)

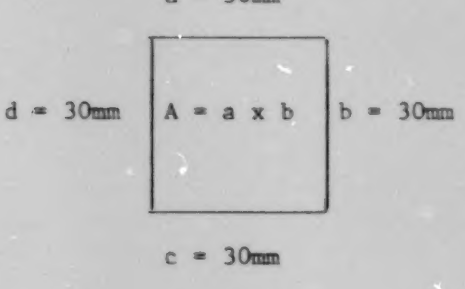
Objective(s):

To give the student more practice in calculating square areas in metric units.

Procedure:

Give the students a worksheet with different shapes such as squares, triangles, and rectangles and the formulas for finding their areas. Have the students measure the shapes in mm and calculate the areas in cm^2.

Example:



$A = 9\ cm^2$

Resources and Materials:

Rulers
Worksheet
Stair step model
(student made)

Evaluation:

Check the worksheet for errors in converting.

Comments on use:

Have measurements on the worksheet as exact as possible. Have students label each measurement so there is no confusion.

Kerry Vitkus

Subject Area(s) Math

Unit(s) Metrics (Square)

Objective(s):

To give the students more exposure to measuring and working with square area.

Procedure:

Have the students measure length and width of such objects as desks, books, floors and walls. Using their measurements, have them compute the areas. Then have them convert their answers to different square measurements.

Other problems could be given such as: Carpet costs \$8 per m^2 how many m^2 would cover the room and how much would it cost? Include other problems using measurement and finding square area.

Resources and Materials:

Rulers and tape measure
Common object in the room
Worksheet with problems

Evaluation:

Checks students as they measure to be sure they are measuring correctly.
Check worksheet for errors.

Comments on use:

Kerry Vitkus

Subject Area(s) Math

Unit(s) Metrics (Square)

Objective(s):

To become familiar with the relationship between metric units of area.

Procedure:

Show how to find the area of a room in feet and inches. Explain that with metrics, it is much simpler because you only use one unit of measure and that it is more accurate.

Show that since metrics is based on 10 that square area is based on 100, 10 x 10.
Examples:
1 km^2 = 1,000m x 1,000m = 1,000,000m^2 = 10^6m^2
1 m^2 = 100cm x 100cm = 10,000cm^2 = 10^4cm^2
1 cm^2 = 10mm x 10mm = 100m^2

When interchanging units of measure instead of moving the decimal one place to the right or left, they will now move it two places for each unit of measure.
Example:
144mm^2 = 1.44cm^2

Worksheet optional.

Resources and Materials:

An overlay on drawing showing 1dm squared with cm marked off resulting in 100cm
Worksheet with simple conversions

Evaluation:

This is a working and discussing assignment. A worksheet may be given if the instructor sees the need for one.

Comments on use:

The problems used on worksheet should only use small numbers and units smaller than meters. More difficult problems should be used after the introduction of the Stair Step Model for square measurement.

Kerry Vitkus

Subject Area(s) Math

Unit(s) Metrics (Square)

Objective(s):

The introduction of the Stair Step Model for square area.

Procedure:

The Stair Step for linear measurements should be placed on the chalkboard or overlay.

The students will be told that they will use the Stair Step for square area similarly to the one for linear measurements.

Place the exponent of 2 by each measurement, example: cm^2, mm^2

Show that changing from cm^2 to mm^2, you go down one step times the exponent of 2 or 2 decimal points to the right. Show several examples until they understand.

Impress the idea of moving so many steps up or down times the exponent to find the number of places to move the decimal point.

Give a worksheet of conversions using the Stair Step.

Resources and Materials:

Chalkboard or overlay
Worksheet of problems

Evaluation:

Check the worksheet to see that the students are converting the measurements properly. 90 percent accuracy should show a good understanding of the principle.

Comments on use:

Give several problems at different times to catch any misunderstanding. With each worksheet encourage the students to make a new Stair Step Model of their own.

Kerry Vitkus

Subject Area(s) Math

Unit(s) Metric (Cubic)

Objective(s):

To familiarize the student with metric cubic measurements.

Procedure:

Be sure to explain to the students that cubic measure does not mean capacity such as the English system uses gallons and quarts, but cubic area of an object. For capacity in the metric system, liters are used.

Objects are measured in metric units and calculated according to usual formulas. Students should be familiar with these formulas so that the learning activities are using metrics not learning formulas.

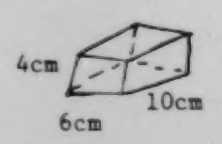
Give students a worksheet for problems showing measurements of a different object, such as rectangular solids, cubes, and other solid prisms. Have the students solve for the cubic area for these solids.

The measurements for the objects could be given in the same units or in different units, such as cm and mm, so that the students will have to convert to like units before calculating the cubic area.

Resources and Materials:

Worksheet of problems

Example:



Answer: $240cm^3$

Evaluation:

Check the worksheet for math errors but particularly for checking the labeling.

Comments on use:

Home objects such as cereal boxes, liquid containers, and food items, such as cheese, may be brought to the classroom to show how familiar objects are measured.

Kerry Vitkus

Subject Area(s) Math

Unit(s) Metric (Cubic)

Objective(s):

To show the students how to use the Stair Step for unit conversions in cubic metric measurements.

Procedure:

Put the Stair Step with unit symbols on a chalkboard or on an overlay.

For cubic measure, explain that the exponent 3 is used and what it means. Place the exponent of 3 by each unit on the Stair Step.

Explain to the students that when converting units for cubic measurements, the student will move on the Stair Step as usual and take the number of steps up or down times the exponent 3 to find number of decimal places moved. Give a few examples.

Give a worksheet to the student with problems of conversion. These problems may include problems of finding cubic area first then converting to different units.

Resources and Materials:

Chalkboard or overlay
Worksheet

Evaluation:

Check problems for correct number of decimal places moved.

Comments on use:

Kerry Vitkus

Subject Area(s) Mathematics

Unit(s) Fine Arts & Humanities
Newspaper Reporter

Objective(s):

Students will demonstrate: use of percentage and graphs by reporters, importance of reading graphs in the reporting field. Use of multiplying decimals and finding percents of numbers, and create an awareness of everyday use of statistical data and graphs in a reporters career.

Procedure:

Have students observe a school basketball game and keep track of shots taken and shots made by at least 5 players. Then have them figure percentage of shots made both individual and team.

Have students keep track of number of absents in their math class for one week, then plot this information on a line or bar graph.

Give each student a circle graph with information of any type and have them represent this as raw-data.

Collect graphs from magazine or newspaper and interpret them to find what raw data was used originally.

Keep notebook on examples from radio, TV, or newspaper reports that show use of graphical information, statistics and percentages.

a. Show use of all types graphes---line, bar, circle
b. Show use of computing statistics
c. Show use of percentages

Resources and Materials:

Local basketball game.

Present math class.

Modern Applied Mathematics
Gold-Carlburg
Houghton-Mifflin
Copyright 1971 Chapter 11

Local newspaper or any magazine.

Clippings from local newspaper.

Bring speaker in from radio or TV station.

Have area newspaper reporter speak to class.

Film: "Journalism"
16mm black and white
Rental $1.75 and return postage
Carl F. Mahnke Productions
215 East Third Street
Des Moines, Iowa 50309

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Fine Arts & Humanities
Newspaper Reporter, p. 2

Objective(s):

Procedure:

Resources and Materials:
American Newspaper Publishers Association
730 Third Avenue
New York, NY 10017

The Newspaper Fund, Inc.
Box 300
Princeton, NJ 08540

American Newspaper Guild
Research Department
1126 16th Street, N.W.
Washington, D.C. 20036

American Council on Education for Journalism
School of Journalism
University of Missouri
Columbia, MO 65201

Association for Education in Journalism
425 Henry Mall
University of Wisconsin
Madison, Wisconsin 53706

Evaluation:

Comments on use:

Ruth Ann Walk

Subject Area(s) Mathematics

Unit(s) Fine Arts & Humanities
Advertising Illustration Artist

Objective(s):

Students should be aware of use of proportions, scale drawing, and accurate measuring needed in advertising field.

Procedure:

Construct an illustrated advertising page with several ads as a class project.

a. Show use of scaled drawing.
b. Show use of ratio and proportion.
c. Show use of geometric construction.
d. Stress accurate measuring of lines using both U.S. and metric systems.

Have each student draw at least 3 different views of the teachers desk given the original dimensions.

a. Draw this as it might appear in an ad.

Have students use geometric construction to illustrate a possible cover for a geometry book.

Give students data for several smaller ads and have them arrange and illustrate them as they might appear in newspaper.

Have students collect advertisements from any magazine or newspaper that would illustrate a use of mathematical knowledge.

Resources and Materials:

Plan a field trip to the advertising section of newspaper or magazine.

Have speaker from advertising firm.

Class room desk.

Write for Creative Drawing-Bulletin 87, Kansas State University Engineering Experiment Station Manhattan, Kansas 66504

Data from your local school yearbook.

Local newspaper or magazines.

Film: "How a Commercial Artist Works"
16mm black and white, return postage
Modern Talking Picture Service
3 East 54th St.
New York, NY 10022

Evaluation:

Class and individual projects

Comments on use:

Ruth Ann Walk

Subject Area(s) Mathematics

Unit(s) Graphic Arts

Objective(s):

The student will be able to convert from seconds, to minutes, to hours. The student will be able to multiply whole numbers and fractions. The student will be able to find the area of a rectangle.

Procedure:

The teacher will discuss what is included in the Graphic Arts Industry.

Problems:

If you worked with printing newspapers for mass graphic communications-up to 85,000 papers per hour in full color, can be completed. How many newspapers would be completed in eight hours?

Electronically programmed controls help craftsmen print six colors simultaneously on sheets 4½ feet wide and 6½ feet long at speeds of two sheets per second. How many of these sheets could be produced in one hour? What would be the surface area of one of these sheets?

Resources and Materials:

"Answers to some questions about Careers in Graphic Communication"
Education Council of the Graphic Arts Industry, Inc.
An affiliate of the Graphic Arts Technical Foundation
4615 Forbes Avenue
Pittsburgh, Pennsylvania 15213

"Careers in Graphic Communications"
Education Council of the Graphic Arts Industry
4615 Forbes Avenue
Pittsburgh, PA 15213

Evaluation:

Class and individual projects

Comments on use:

Ruth Ann Walk

Subject Area(s) Mathematics

Unit(s) Fine Arts & Humanities
Theatrical Scenery Designer

Objective(s):
Students will have: awareness of scale drawing and geometric construction necessary to the scenery designer, realization of the necessity of accurate measurement, awareness of complex measurement and spatial knowledge needed in scenery designer profession, awareness of arithmetic used before buying paint supplies.

Procedure:
Have the class as a group develop a simple stage setting on paper. Then let each student figure measurements and construct one piece of the background scenery.

Give the class the dimensions of a stage curtain and have them fit in doors and windows of the right proportions.

Have each pupil observe a play. Then discuss in class where mathematics might have been used in construction of scenery.

Let each student create his own stage setting. Then with cardboard create a scaled version of the finished set.

Given the dimensions of several pieces of scenery (possible from activity #1) and area covered by paint. Have student calculate the amount of paint needed to cover each piece. (teacher supplied dimensions)

Resources and Materials:
Any play book from library or teacher supplied.

Measurement of school stage.

Local play or possibly one on television.

Play books for initial idea.

Cardboard from boxes at grocery store or furniture store.

Paint coverage from local paint store.

Evaluation:

Class and individual projects

Comments on use:

Ruth Ann Walk

Subject Area(s) Mathematics

Unit(s) Fine Arts & Humanities/Music

Objective(s):

Students will have: awareness of the importance of fractions in writing music, awareness of the complex work involved to find a wave length which is music related, awareness of the use of geometrical reasoning and spatial forms in the field of a repairman.

Procedure:

Music Writer

a. Take a score of music and evaluate the numerical value of each note. Then use this as a drill for addition of fractions.
b. Have students do research on the new idea of writing music by mathematical formula and a computer.

Music Critic

a. Find the wave lengths for several pieces of music using the mathematical formula FL=V. F=wave, L=length, V=speed of sound.

Stringed Instrument Repairman

a. Have students do research on the spatial forms necessary to use in the repairmans career as well as the analytical ability necessary.

Resources and Materials:

Any song book or piece of sheet music with a wide range of note types.

Career Guidance books in local library.

Film: "Keys to Creativity"
The Wurlitzer Co.
Advertising Manager
DeKalb, ILL 60115
Return postage

Steinway News, Steinway & Sons
Steinway Place
Long Island City
New York 11105

Problems from Modern Algebra I
Dolciana-Wooton
Houghton Mifflin, copyright 1970
pg. 398

Research Music Educational
National Conference
The National Ed. Assoc. of U.S.
1201 16th St.
N.W. Washington, D.C. 20036

Evaluation:

Class and individual projects

Comments on use:

Ruth Ann Walk

Subject Area(s) Mathematics

Unit(s) Fine Arts & Humanities
Museum Curator

Objective(s):
Students will have: an awareness of how important budgeting is in any field showing use of decimal numbers and percentages, an awareness of drawing with using measurements and scale drawings, an awareness of importance of learning ancient numberation systems for a career, an awareness of use of graphs in the administrative part of curators work.

Procedure:

Using a specified amount of money. Set up a budget for managing a museum for one year.
- a. Thought in money management
- b. Use of all basic mathematical skills.
- c. Use of percentages (both finding and using)

Sketch an imaginery finding site and position of the found item.
- a. Use of drawing blueprints
- b. Use of 3-D drawing.

Set flower pot or vase on desk and have students represent its shape graphically. (This is a method of classifying ancient arts by use of computer.)

Using a history approach let students present research done on ancient numberation systems.

Give students numbers showing attendance to museum over a 12 month period and have this plotted on graph.
- a. Analyse this information as to months of high-low attendence, etc.

Resources and Materials:

Consumer Mathematics
2nd Ed. Lankgord, Goe Harcourt, Brace, Jovanovich, Inc.
Copyright 1974, pg. 193-4

Ancient Art from Afghanistan
(2 strips-2 records) $26
BFA Education Media
2211 Michigan Av.
Santa Monica, California 90404

Flower Pot

Mathematics 7
McSwain, Brown Gundlach Cooke
Laidlaw Bros. 1963

Reference Book

History of Mathmatical Notation
Cajori

Evaluation:

Class and individual projects

Comments on use:

Subject Area(s) Mathematics

Unit(s) Anthropology

Objective(s):

The student should be able to read and write numbers in Egyptain, Roman, Babylonian, etc. be able to make a scale drawing of an artifact, or of an imaginary excavation site, be able to compare our decimal base ten money system with other money systems.

Procedure:

The teacher will discuss the use of mathematics with the study of anthropology and will direct the student in related activities. Some of these activities might include:

Since anthropology is concerned with the history and development of man, the development of the various numberation systems could be discussed and researched.

An anthropologist must be able to draw scale models of excavation sites--similar to blue prints.

An anthropologist would map out his travels to various excavation sites. If the student were an anthropoligist he would need to figure his traveling mileage and expenses to the site. Information concerning the location of an excavation site, then could figure the mileage from his home to the sites. They could figure the expenses of food, motel, hotel, etc. Decimals

An anthropologist would need to know something about the economic and money systems used.

Resources and Materials:

Math textbook
References which discuss the history of math. Films about the history of math.

Contact a local architect firm for information concerning how to draw blue prints.

Write to the Am. Anthropology Assoc.
1703 New Hampshire Av.
N.W. Washington, D.C. 20009

Write to the U.S. Treasury Dept.
Washington, D.C.
for information about money and the history of money.

Evaluation:

Class and individual projects

Comments on use:

Ruth Ann Walk

Subject Area(s) Mathematics

Unit(s) Consumer and Homemaking
Interior Design

Objective(s):
Students will develop an awareness of different types of math used by interior decorators including measurement for finding area, use of sq. units.

Procedure:

Give students dimensions of a window. Then have them find how much material would be needed to make curtains (any style they chose)

Give students dimensions of a floor and have them find number of square yards of carpet and square feet of floor tile.

Five students dimensions of wall and have them find the number of square feet of tile needed to cover wall. Also find number for peices of tile 3" square needed.

Draw plans to redecorate a room either at school or home. Use exact measure of wall and floor space exact measure of existing furniture, suggested size of new furniture, amount of material needed for curtains, papering wall, paint, etc.

Give students the dimensions of a room and number of doors and windows with dimensions of each and have them find the total number of square feet of wall and floor space.

Resources and Materials:

Local carpet sales company.

Local paint or lumber supply store.

Field trip to housing development site.

American Institute of Interior Design, Inc.
Suite 700--157
West 57th St.
New York, N.Y. 11019

American Textile
Manufacturing Institute
1501 Johnston Building
Charlotte, N.C. 28202

Film: "Accent Decor"
16 mm color
Return postage
Modern talking Pictures
1212 Avenue of the Americas
New York, NY 10036

Evaluation:

Class and individual projects

Comments on use:

Ruth Ann Walk

Subject Area(s) Mathematics

Unit(s) Consumer and Homemaking
Pattern Maker

Objective(s):

Students will see use of geometric construction in pattern industry and accurate measure for both a design model and actual pattern.

Procedure:

Given the pattern for the back of a bodice with single darts have students divide back dart into two parts.

Have students construct a sailor collar on a simple bodice front.

Given basic sleeve patterns let each student design sleeve with shoulder darts.

Using basic bodice pattern--have students construct a pattern with released fullness darts.

Give each student a sewing pattern piece from a small size pattern and have them enlarge the pattern at least two sizes.

Resources and Materials:

Designing Dress Patterns
Tanous Bennett
Copyright 1964 pp. 39, 156, 136, and 82.

Any child size pattern.

Additional Resource
Flat Pattern Methods
Second Edition
Norma R. Hollen
Copyright 1965

Evaluation:

Class and individual activities

Comments on use:

Ruth Ann Walk

Subject Area(s) Mathematics

Unit(s) Consumer and Homemaking
Home Economist

Objective(s):
Students will develop awareness of the necessity of a budget. An awareness of how much it actually cost to prepare food. An awareness of the true expense that is involved in borrowing money. An awareness of the use of mathematics in everyday duty of housewife. An awareness of the usefullness of polls to an economist with the use of decimal numbers, interest figuring, multiplication of fractions and percents.

Procedure:

Give each student an amount of money as a monthly income-then have them budget this for a family of four.

Let students plan a meal-then find total cost of buying and preparing food and find total cost per person.

Have each student select two or three pieces of furniture on an installment loan.

Give each student a recipe (preferable with several fractional parts) and have them double and find 1½ times the recipe.

Using a public opinion poll have students find percents of each part to the whole.

Resources and Materials:

Prices from any local grocery.

Speaker from an installment department of bank or financing business and extension center or area home economist.

Management for Modern Families
Gross & Crandall
Copyright 1954

Personal Adjustment, Marriage, & Family Living
Landes Copyright 1970
pg. 300-315

Foundations of Mathematics
Wiebe, Copyright 1962
pg. 348-52

Additional General
Borrowing & Installment Buying--film
Set-2 for $20
Ed. Projections Corporation
3070 Lake Terrace
Glenview, ILL 60025

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Consumer and Homemaking
Routeman

Objective(s):

Students will have an awareness of use of making change, counting money and simple arithmetic used by routeman including adding and subtracting decimal numbers. Realize the importance of money management. Decimals

Procedure:

Let each student plan a days work as a routeman and keep a log of money received, change given, and credit given, ect.

Let each student pretend to be a driver of a milk truck--then give each student several different orders with varying items and amounts and have them figure total bills.

Give students information on how much cash, checks charges they took and change they gave for a day and amount they started day with and have them balance at end of day.

Have students write a short paper on job of a routeman and stress the use of mathematics.

Provide several items of varying weights and have students weigh items correct to at least the nearest ounce.

Resources and Materials:

Field trip to trucking firm.

Possible allow students to travel with local routeman.

Local dairy processing plant.

Information from field trip and reference materials.

Career books from counselor or library.

Film: "Driving as a Career"
Series of 4 for $32.00 from
BFA Ed. Media
2211 Michigan Avenue
Santa Montica, CA

United Parcel Service
1001 Second Avenue North
Minniapolis, MN 55405

Scales and items to weight from teacher.

International Brotherhood of Teamsters, Chauffers, Warehousemen

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Consumer and Homemaking
Administrative Dietitian

Objective(s):

Students will have awareness of conversion of pounds to ounces, ect. used as a dietian, an awareness of the wide variety of prices available on the same items, an awareness of planning that is done by dietitian and use of budgets, an awareness of use of graphs and percentages as a dietian.

Procedure:

Have students bring grocery ads from local newspaper--group prices of particular products then calculate which selection would be the best buy.

Have students prepare a menu for one day. Three meals for five persons. Then using grocery ads or prices from local grocery compute the total cost of food and the average cost per person.

Let each student plan a budget for a kitchen feeding 20 people--one meal per day. Plan budget for one month.

Give students monthly expenses for 12 months--have them plot these on a graph. Then find the percentage of increase of decrease from one month to the next.

Hand students a prepared budget for one month from a hospital kitchen and have them find the percentage of total that each item used such as labor, utilities, ect. Also find gross and net profits or losses.

Resources and Materials:

Grocery ads from local newspaper.

Prices from the shelves of local grocery stores and from wholesale warehouses.

Field trip to kitchen or cafeteria.

The American Dietetic Assoc.
620 North Michigan Avenue
Chicago, ILL 60611

Film-Working in Food Services
Price $7.50
Eye Gate
146-01 Archer Av.
Jamaica, NY 11435

Film--Food Production
$5.50
Wright Studio & Camera Shop, Inc.
Jefferson City, MO 65101

Evaluation:

Class and individual projects

Comments on use:

Subject Area(s) Mathematics

Unit(s) Business and Office
Purchasing Agent

Objective(s):
Students will have an awareness of wide variety of prices available and the amount of calculating need to make best buy through the use of decimals. An awareness of the amount of multiplication and addition used to fill a purchase order. An awareness of use of percents to find profit and an awareness of use of graphs and percentages in field of purchasing agent.

Procedure:
Have students gather price information from several sources for the purchase of office machinery of any type. Then calculate which offer would be the best buy.

Have students prepare a purchase order for a company such as a plumbing company with varying number of each item. Have them calculate the total cost of each lot of items and total cost of the purchase order.

Give students both wholesale and retail prices for several items of food. Then have them compute the percentage of profit made from each item.

Give students data for the number of cars sold by a car dealer each month for one year. Have them plot this information on a graph and find the percentage of increase or decrease between each month.

Have each student research the work done by a purchasing agent putting emphasis on mathematic aspect. Then have class discussion of the reports.

Resources and Materials:
Local office supply company and their catalog.

Ads in local newspaper.

Modern Applied Mathematics
Gold-Carlberg
1971 pp. 334-5

Price list from local wholesale warehouse and grocery.

Data from local car dealer.

Career Opportunities
New York Life Ins. Co.
Box 51, Madison Sq. Station
New York, NY 10010

National Assoc. of Purchasing Agents
11 Park Place
New York, NY 10007

Field trip to office of a purchasing agent.

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Business and Office/Banker

Objective(s):
Students will develop an awareness of how banks can make money on interest. An awareness of the bankers interest in the farmer through the use of simple and compound interest. An awareness of how banks invest to make money through the use of percent and decimals and interest.

Procedure:

Have each student obtain the price of a new car they would like to own, then using the going rate of interest have them figure interest they would pay if borrowing the money.

Let each student pretend he is buying cattle to start a herd and borrowing the money. Have him calculate the interest he will pay, price he will receive when selling and the profit he will make.

Let each student pick an amount of money to invest at the going rate of interest and calculate the amount of interest the money will draw over a two year period compounded semi-annually.

Let students find which would be the better investment for a banker's money--an investment guaranteed to return 8% compounded quarterly or one guaranteed to return 8½% compounded semi-annually.

Have students visit a bank and visit each department. Then as a class summerize the uses of mathematics in banking.

Resources and Materials:

Local car dealer.

Interest rate from local bank.

Buying and selling price of cattle from stockmarket reports on radio, TV or newspaper.

Interest rates from local bank.

Film: "Banking: No limit to Dimensions"
Continental ILL National Bank
231 S. LaSalle St.
Chicago, ILL 60690
Pay return postage.

Field trip to local bank.

Film: "Banking In Action"
Assoc. Films, Inc.
600 Madison Av.
New York, NY 10022

National Association of Securities Dealers
888 17th Street N-W
Washington, D.C. 20006

Evaluation:

Class and individual projects

Comments on use:

Subject Area(s) Mathematics

Unit(s) Business and Office/Accountant

Objective(s):
Students will have an awareness of what an accountant needs to know to advise clients in the line of the use of decimals and wise decision making skills.

Procedure:
Take a field trip to a local accounting firm and have students take note of how mathematics is used by an accountant.

From observations made on field trip have student prepare a discussion of mathematics in the field of accounting.

Give students a ledger of transactions that take place during one month in a checking account. Have them find the balance at the end of the month.

Have each student prepare his or her federal income tax return in class. If they held no job have them create an imaginery income and job situtation.

Give students a rough overall view of the financial status of a small business and a current selling price of the business, then as a class have them decide if it would be better to keep the business of sell.

Resources and Materials:
Local accounting firm.

Foundations of Mathematics
Wiebe 1962 pp. 330

Teaching Taxes
Internal Revenue Service
Washington D.C. 20233

Accounting In Business Decisions
Black, Champion, Brown
1967 pp. 22

Accounting Careers Council
National Distribution Center
P.O. Box 650, Radio City Station
New York, NY 10010

National Association of Accountants
505 Park Avenue
New York, NY 10022

The American Accounting Assoc.
School of Commerce
University of Wisconsin
Madison, WI 53700

Am. Institute of Certified Public Accountants, 666 5th Avenue,
New York, NY 10019

Evaluation:

Comments on use:

Ruth Ann Walk

Subject Area(s) Mathematics

Unit(s) Business and Office/Actuary

Objective(s):

Students will be acquainted with an actuary career. Will have an awareness of the use of graphs, statistics, and census information by an actuary.

Procedure:

Have students research the career of an actuary and present the research to the class for discussion.

Give students a set of raw test scores and have them graph the distribution of scores.

Given raw data have students compute the mean median and mode.

Have students gather information that an actuary might use, such as expected life spans, number of births and deaths during a year, number of cancer related deaths, ect. Then analyse this for the information an actuary might use.

Given raw data have students arrange in descending order and find a frequency distribution and construct a histogram.

Resources and Materials:

Society of Actuaries
208 S. LaSalle St.
Chicago, ILL 60604

Secretary Casualty
Actuarial Society
200 E. 42nd St.
New York, NY 10017

Career Opportunities
Career Information Service
New York Life Ins. Co.
Box 51 Madison Sq. Stat.
New York, NY 10010

Foundations of Mathematics
Wiebe, 1962 pp. 344

Bureau of Census
Washington D.C. 20233

County Recorder Office

Foundations of Mathematics
Wiebe 1962 pp. 336-7

Film: In Common Cause
John Nancock, Mutual Life Ins. Co., Public Relations Department, 200 Berkley St., Boston, MA 02117. Pay return postage.

Evaluation: Class and individual projects.

Comments on use:

Subject Area(s) Mathematics

Unit(s) Business and Office/Retailing

Objective(s):

Students will have: an awareness of the use of percents to find profit by retailing, an awareness of how retailers arrive at sale prices and selling prices, and an awareness of the cost of shipping merchandise.

Procedure:

Give students the wholesale and retail price of an item, then have them find the percent of mark-up.

Give students the retail price of several items then have them find the price of the item if it were sold at a 25% discount.

Given the wholesale price of several items have students find retail price if the item is to be sold at a 42% profit.

Using either real or fake money have students learn and practice giving change as they might do as a clerk.

Using any mail-order catalog have students compute shipping charges on a number of items of varying weights.

Resources and Materials:

Local retail and wholesale businesses.

Modern Applied Mathematics
Gold-Carlberg
1971 pp. 332-3

Any mail-order catalog.

Committee on Careers in Retailing
National Retail Merchants Assoc.
100 West 31st Street
New York, NY 10001

Film: "The Care and Handling of Buyers"
Modern Talking Picture Service
1212 Avenue of the America
New York, NY 10036

"Sounds of Freedom"
General Mills Incorporated
Film Library
9200 Wayzata Bovlevard
Minneapolis, MN 55440

Evaluation:

Class and individual projects

Comments on use:

Ruth Ann Walk

Subject Area(s) Mathematics

Unit(s) Forestry

Objective(s):

Student will be able to find a percent of a number, to use this information to make a circle graph showing the portions of foresters in each area of work, to add and subtract decimal amounts of money, to figure board feet, to find the volume of a cylinder, to understand the relationship of a diameter and radius of a circle, to write an equation and divide fractions, to write an equation and find a percent when given two numbers.

Procedure:

The teacher will discuss the use of mathematics in forestry. Some activities related to forestry and information about forestry might include:

There are about 25,000 professional foresters in the United States. About 50% of these work for public forestery agencies--federal, state, and local. How many people work for public forestery agencies? Some 37% of the foresters are self-employed or are employed by private industrial concerns. How many foresters are employed by private industry? The remaining 13% are in teaching and research or are in graduate school. How many foresters are involved here?

Since salaries on the Federal, State, Local, and Private levels of work differ, a comparison could be made of each salary schedule.

Timber cruising. One of the first things to be done is to estimate how much of a certain area of forest land will yield in board feet of lumber or tons of pulpwood. Suppose you are concerned with 20 acres of forest land, figure how many board feet of lumber this land will yield? More than eleven billion board feet of timber are cut each year.

Scaling logs. Another job of a forester is to find out the volume of lumber a log will yield. Suppose

Resources and Materials:

"Ask Any Forester"
Society of American Foresters 1900
1010 Sixteenth Street
N.W. Washington, D.C. 20036
Phone 202-296-7820
July 1973

Contact local chip mills or saw mills for information concerning timber cruising. The school industrial arts teacher may be able to assist with figuring board feet.

SRA Occupational Brief 340
"Forest Technicians"
Science Research Associates Inc.
259 East Erie Street
Chicago, ILL 60611
Reorder No. 05-990340

The University Society Encyclopedia
The University Society Inc. Midland Park
New Jersey
Page 136

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Forestry, p. 2

Objective(s):

Procedure:

the log you scale is ten feet long with a diameter of twenty inches.

Approximately ¼ of the world's land area some 10 billion acres-is forest land. How much land area is there in the world? The forest area of the United States is approximately 647 million acres, of which 484 million acres are classified as commercial forest land. What percent of forest land is classified as commercial forest?

Missouri has 1,375,000 acres of forest land. This is what percent of the total forest area in the United States?

By writing for more information about forest and forestry statistics, various types of graphs and problems could be worked.

Resources and Materials:

Write to the United States Dept. of Agriculture (Forest Service) Washington D.C. 20250

"Timber Trends in the United States 1965 $1.75
FRR 17 1506-73

"Timber Owner and his Federal Income Tax" 1971 .50c
AH 274 1505-73

"Women in The Forest Service"
1972 M 1058 1363-73

Evaluation:

Class and individual projects

Comments on use:

Subject Area(s) Mathematics

Unit(s) Hotel-Motel

Objective(s):

The student will be able to multiply whole numbers, multiply with decimals and add decimals.

Procedure:

Teacher will discuss the duties of a hotel or motel accountant. Some related activities might include:

You are a motel accountant and a family of five stops for an evening. They ask for two rooms and each room is $20 per night. How much would their bill be? Remember to add tax.

Resources and Materials:

"Your Career In The Lodging Industry"
The Educational Institute
Stephen S. Nisbet Building
Michigan State University
1407 South Harrison Road
East Lansing, MI 48823

"Banking"
16mm sound, 18 min., color, 1973
Pay return postage
BK 2 months advance
Aetna Life and Casualty
Public Relations and Advertising Dept.
Film Library
151 Farmington Avenue
Hartford, CT 06115

"Banking In Action"
16mm, sound, 20 min., color
Pay return postage
Give dates wanted well in advance

Federal Reserve Banks
Western Missouri Only
Federal Reserve Bank of Kansas City
Kansas City, MO 64198

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Hotel-Motel, p. 2

Objective(s):

Procedure:

Resources and Materials:

"Bread" (30025)
16mm, sound, color, 20 min.
available to 7th grade and above
Real life money management decisions
Pay return postage
Book one month advance
Modern Talking Picture Service
1686 Elmhurst Road
Elk Grove Village
Chicago, ILL 60007

"Budgeting"
16mm, sound, color, 11 min., 1973
Aetna Life and Casual

"Buying"
16mm, sound, 13 min., color, 1973
Aetna Life and Casualty

"Credit"
16mm, sound, color, 18 min., 1973
Aetna Life and Casualty

"Credit (39)"
16mm, sound, color, 20 min.
Pay postage and ins. both ways
Bk 2 months advance

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Hotel-Motel, p. 3

Objective(s):

Procedure:

Resources and Materials:
West Glen Films
565 Fifth Avenue
New York, NY 10017

"Death and Taxes"
16mm, sound, color, 18 min., 1968
Traces history of income tax
Block, H and R (local)

"Dollars and Sense (2317)"
16mm, sound, 14 min., color
About insurance, life
retirement
Available to high school and above

Association-Sterling Films
8615 Directors Row
Dallas, TX 75247

"Insurance"
16mm, sound, 16½ min.
Aetna Life and Casualty

"The Littlest Giant" (S-416)
16mm, sound, color, 14 min.
Consumer credit information
Association-Sterling Films

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Hotel-Motel, p. 4

Objective(s):

Procedure:

Resources and Materials:

Money on the Move
The Federal Reserve Today
16mm, sound, 27 min., color, 1969
Fed. Reserve Bank of Kansas City
Kansas City, MO 64198

"Introduction To Digital Computers"
(AUU 4756)
16mm, sound, 24 min., color, 1969
Pay return postage
BK 2 weeks
UNIVAC Film Library
UNIVAC Division of Sperry Rand
Advertising and Sales Promotion
P.O. Box 500
Blue Bell, Pennsylvania 19422

"This Business of Numbers"
(AVV 4759)
16mm, sound, color, 20 min., 1969
Gives animated coverage of
arithmetic from caveman to pre-
sent day.
UNIVAC Film Library

Evaluation:

Comments on use:

Ruth Ann Walk

Subject Area(s) Mathematics

Unit(s) Personal Service Occupations
Cosmetologist

Objective(s):

Students will: be able to set up and/or interpret an appointment book. Making charts and writing times. Student should be able to make change and if need be, help with the managerial duties of record keeping, be able to keep a record of supplies, maintenance, or supervision of employees, be able to read data which would help them stay abreast with changing styles and techniques.

Procedure:

The teacher will direct, discuss, and/or supervise activities related to Cosmetology in the area of mathematics.

Set up an appointment book for a cosmetologist.

Get an appointment book from a local source which has been set up, and discuss it.

Work on making change with money.

Make up a mock model of a beauty salon staff.

Set up a chart of beauty shop supplies, another for shop maintenance, and one for employees.

Look at current periodicals for examples of data related to changing styles and techniques.

Get a box of money and let them count change.

Have a guest speaker from a local beauty salon.

Resources and Materials:

Local cosmetologist

Handle, Dorothea Zack
The Hairdo Handbook

Kit: I Want to be a Beauty Operator.

Write to:
National Association of Cosmetology Schools, Inc.
3839 White Plains Road
New York, NY 10067

National Hairdressers and Cosmetologists Association
175 Fifth Avenue
New York, NY 10010

Film:
"Good Looks"
16mm, color, sound, 20 min.
Pay return postage (order 1 month in advance)
Modern Talking Picture Service
1212 Avenue of the Americas
New York, NY 10036

Evaluation:

Class and individual projects

Comments on use:

Subject Area(s) Mathematics

Unit(s) Personal Service Occupations
Dentist

Objective(s):

Student should: have good judgment of space and shape, know something about cost of equipment and money required for starting own business, know the alternatives of other working conditions other than owning own office, be able to interpret or chart statistical data in this field.

Procedure:

The teacher will direct, discuss, and/or supervise activities related to Dentistry in the area of mathematics.

Work a great deal with shapes and space ideas in geometry.

Write a paper on the cost of equipment and money required to set up a business of this type in their own home town.

Do some research on financial expenses other than owning a business.

Set up some charts, graphs, etc. of statistical data in the area of dental work.

Have a local dentist as a guest speaker.

Resources and Materials:

Local dentist

Blackerby, P.E. Jr. "Should You Be A Dentist?" (Pamphlet)

Miner, L.M. Dentistry

Lapp, Carolyn Dentist Tools

Careers in a Medical Center

Filmstrips:
"Introduction to Demonstrative Geometry."
"Basic Angles and Experimental Geometry."

Paffenbarger, George Corbly
Frontiers of Dental Science

Resources--write to:
American College of Dentist
4236 Lindell Blvd.
St. Louis, MO 63108

International College of Dentist
4829 Minntonka Blvd.
Minneapolis, MN 55416

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Personal Service Occupations
Dentist, p. 2

Objective(s):

Procedure:

Resources and Materials:

Films:
"Your Magic Step to Career Opportunity"
16mm, color, sound, 6½ min.
Pay return postage
American Dental Association
Bureau of Audiovisual Service
211 East Chicago Avenue
Chicago, IL 606011

"Set the Stage on Dental Health"
16mm, color, sound, 28 min.
Pay return postage
Association Films, Inc.
600 Madison Avenue
New York, NY 10022

Evaluation:

Class and individual projects

Comments on use:

Subject Area(s) Mathematics

Unit(s) Personal Service Occupations
Health Salon

Objective(s):

Student should be able to work problems related to various areas of this career. (physics, inorganic and organic chemistry, biology). Student should have a good workable understanding of the measuring systems, such as metric, Fahrenheit, and Centigrade scales.

Procedure:

The teacher will direct, discuss, and/or supervise activities related to operating a Health Salon in the area of mathematics.

Make sample charts for people who need different exercises and for young people, old people, those over weight, and/or those who wish to stay fit.

Set up mock situations involving math problems related to diet in helping people who are underweight to gain weight and tone muscles, or who are overweight to lose weight.

Set up examples of indoor heated pools or saunas, and what the correct temperature should be on the Fahrenheit and Centigrade scales.

Resources and Materials:

Local health salon.

Hiller, Glyme Put Your Best Foot Forward

Health Careers (periodical)

Career Education (magazine) Mr. '74

Filmstrips
"Foods for Health"
"Keeping Healthy"
"Getting Acquainted with our Bodies"

"The Fitness Challenge"
16mm, color, sound, 26 min.
Pay return postage,
American Osteopathic Association
Order Department
212 East Ohio Street
Chicago, IL 60611

"Focus of Fitness"
16mm, color, sound, 19 min.
Pay return postage
Eastman Kodak Company
Audio-Visual Service
343 State Street
Rochester, NY 14608

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Personal Service Occupations
Psychologist

Objective(s):
The student should know how to record data on charts and tables, graphs, etc., be able to interpret statistical data, be able to work with a high degree of skill any mathematical problem which might relate to basic and applied research, be able to record and interpret test scores of various kinds.

Procedure:
The teacher will direct, discuss, and/or supervise activities related to Psychology in the area of mathematics.

Make examples of a good record to keep on a child who is six years old for a period of time, such as 12 months.

With some record table or graph, such as the one above, be able to explain what the data means.

Do some line graphs which show loss or gain in some areas.

Make up some tests to be given--oral or written--and have some way of recording the outcomes.

Resources and Materials:
Lewellen, John
You and Your Amazing Mind

Alexander, Arthur
The Hidden You

Fedder, Ruth
You the Person

Lackner, Stephen
Discover Your Self

Super, D.
Opportunities in Psychology
Careers in Psychology
Careers in Mental Health

Film:
"Who Cares about Jamie"
16mm, color, sound, 16 min.
Reserve in advance and pay return postage
Ideal Pictures, Inc.
1010 Church Street
Exanston, IL 60201

Write to:
American Psychologist Association
1200 17th Street

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Personal Service Occupations
Psychologist, p. 2

Objective(s):

Procedure:

Resources and Materials:

N.W., Washington, D.C. 200

Department of Mental Hygie
State of New York
119 Washington Avenue
Albany, NY 12225

Psychologist
(cost 10¢)
Occupational Outlook Repor
1970-71 (Bulletin 1650-42)
Superintendent of Documents
U.S. Government Printing Of
Washington, D.C. 20402

Evaluation:

Class and individual projects

Comments on use:

Subject Area(s) Mathematics

Unit(s) Personal Service Occupations
Veterinarian

Objective(s):
The student should develop a good working knowledge of mathematical thoughts, analysis, or equipment related to research on health of animals, investigate financial costs of drugs, instruments, etc. of starting own practice, or purchasing one already established, list several job areas related to veterinarians, and have some knowledge of finances involved in proper care of pets at an animal center.

Procedure:
The teacher will direct, discuss, and/or supervise activities related to being a Veterinarian in the area of mathematics.

Play the game of battleship, or any other that involves mathematical ideas.

Set up a chart for a sick animal.

Make a survey of cost of equipment, drugs, etc. for starting a practice of their own or taking over a practice already established.

Make lists of various jobs or duties preformed at a center for animal care.

Make a chart on costs of shearing poodles and spaniels, bathing and grooming pets.

Resources and Materials:
Dean, Nell
The Vet is a Girl (Fiction)

DeKruif, Paul Henry
Hunger Fighters

Chrystie, Frances
Pets

Haberman, Jules J.
The Farmer's Veterinary Handbook

Jones, T.J.
Veterinarian

Kays, John M.
Basic Animal Husbandry

Riser, Wayne
Your Future in Veterinary Medicine
At an Animal Hospital

School of Veterinary Medicine
(Bulletin) M.U.-Columbia, MO

Filmstrip
"Veterinarian"

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Personal Service Occupations
Veterinarian, p. 2

Objective(s):

Procedure:

Resources and Materials:

"The Veterinarian"
46mm, color, sound, 26 min.
Book several months in advance
Pay return postage
Texaco, Inc.
Sales Promotion Manager
332 South Michigan Avenue
Chicago, IL 60604

Write to:
American Veterinary Medical Assoc.
600 South Michigan Avenue
Chicago, IL 60605

Agriculture Research Service
U.S. Department of Agriculture
Washington, D.C. 20250

Evaluation:

Class and individual projects

Comments on use:

Subject Area(s) Mathematics

Unit(s) Marketing and Distribution Careers
Salesperson

Objective(s):
Students will be able to take the customer's money and give him proper change, have a better understanding of the value of various items in jewelry stores, have a general knowledge of how salespeople relate to customers and manufacturers, and get some exposure to the importance of a computer, and a credit manager in relation to customers who are good or poor credit risks, mailing of notices of delinquent payments, and assisting collectors who settle overdue accounts.

Procedure:
The teacher will direct, discuss, and/or supervise activities related to being a Salesperson in the area of mathematics.

Role play with magazine and newspaper selling.

Write a paper on working in a jewelry firm, include knowledge needed about valuable stones, and mannerisms.

Make a chart of types of real estates available and the cost in their own local area.

Do some research on being a manufacturers' salesperson.

Have a guest speaker from local real estate agency.

Make a list of manufacturers in Missouri who would use the services of an industrial salesperson.

Compile an expense account of a make-believe business to be turned over to a supervisor.

Make a chart of businesses which employ cashiers and/or salespersons.

Prepare a report on credit cards, credit manager, and central credit bureau.

Resources and Materials:
Houlehen, Robert J.
The Battle For Sales

Kit
Job Experiences Salesperson

Schirmon & Lyons
Careers in a Department Store

Schiron & Lyons
Servicemen and Women and What They Do

Local business hiring salespersons.

Gross, M.
Phill Sterling, Salesman

Whitney, R. A.
Should You Be A Salesman?

Write to:
Automobile Salesman
National Automobile Dealers Assoc.
2000 K Street
N.W. Washington, D.C. 20006

Nat. Independent Auto Dealers Assoc.
1719 West End Avenue

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Marketing and Distribution Careers
Salesperson, p. 2

Objective(s):

Procedure:

Resources and Materials:
Suite 707
Nashville, TN 37203

Films:
Automobile Salesman
"A Car Is Born"
16mm, color, sound, 28 min.
Book 3 weeks advance, pay return postage

"The Automobile Engine"
16mm, color, sound, 19 min.
Book 3 weeks advance, pay return postage

Order the above from
Ford Motor Company
Film Library
The American Road
Dearborn, MI 48121

Write to:
Petroleum Salesman
Sales & Marketing Executives International
630 Third Avenue
New York, NY 10017

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Marketing and Distribution Careers
Salesperson, p. 3

Objective(s):

Procedure:

Resources and Materials:

Am. Petroleum Institute
1271 Ave. of the Americas
New York, NY 10020

National Oil Jobbers Council
1701 K Street
N.W. Washington, D.C. 20006

Films:
Petroleum Salesman
"American Frontier"
16mm, black & white, sound, 29 min.
Pay return postage

"Conserving a Heritage"
16mm, color, sound, 16½ min.
Pay return postage
Order from American Petroleum Institute Committee on Public Affairs
1271 Avenue of the Americas
New York, NY 10020

Write to:
Real Estate Salesman
National Assoc. of Real Estate Boards
36 South Wabash
Chicago, Il 60602

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Marketing and Distribution Careers
Salesperson, p. 4

Objective(s):

Procedure:

Resources and Materials:

American Land Title Association
1725 I Street,
N.W. Washington, D.C. 20006

Films:
Real Estate Salesman
"Salesmanship: Art or Science"
16mm, color, sound, 25 min.
Pay return postage
Modern Talking Pictures Service
1212 Avenue of the Americas
New York, NY 10036

Write to:
Retail Salesman
Committee on Careers in Retailing
National Retail Merchants Assoc.
100 West 31st Street
New York, NY 10001

Sales and Marketing Executives
International
630 Third Avenue
New York, NY 10017

Films
Retail
"The Care and Handling of Buyers"
16mm, black and white, sound, 45 min

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Marketing and Distribution Careers
Salesperson, p. 5

Objective(s):

Procedure:

Resources and Materials:

Pay return postage
Modern Talking Picture Service
1212 Ave. of the Americas
New York, NY 10036

Write to:
Speciality Salesman
Sales Occupations (Occupational Outlook Briefs)
U.S. Department of Labor
Bureau of Labor Statistics
Washington, D.C. 20012

Write to
Wholesale Salesman
National Association of Wholesalers
1725 K Street
N.W. Washington, D.C. 20006

Fashion Saleswoman
Committee on Careers in Retailing
National Retail Merchants Assoc.
100 West 31st Street
New York, NY 10001

Pendleton Woolen Mills
Home Economics Department
218 S. W. Jefferson Street
Portland, OR 97201

Evaluation:

Class and individual projects

Comments on use:

Charldine Smart

Subject Area(s) Mathematics

Unit(s) Marketing and Distribution Careers
Display Workers

Objective(s):
The student will be able to understand a few of the duties of this career, such as arranging displays inside the store and planning for seasonal arrangements of merchandise, be able to show sections of U.S.A. and have fractional numbers or percents used to show comparisons of seasonal affects on merchandise being considered, gain a working knowledge of cost of materials, and other mathematical concepts related to planning, making, setting up a display, work with camera setting on distance, amount of light needed, shutter speed, lens opening and any other mathematical ideas involved with their photography through measurement.

Procedure:

The teacher will direct, discuss, and/or supervise activities related to being a Display Worker in the area of mathematics.

Write a report on activities which a display worker for a large store would be expected to perform.

Make a chart of at least four different sections of the United States and show how the seasons of each area will affect the sale of merchandise, such as clothing.

Make a show card or a sign on cardboard or paper-choosing any size-planning spacing well.

Design, lay out, cut, and finish a display in wood or other materials as animated and/or lighted display unit.

Take photographs which might be used for newspapers, brochures, bullboards, catalogs, and television commercials.

Make some drawing related to students particular field of interest.

Resources and Materials:

Freer, M. M.
Showcase for Diane

Display Man
(pamphlet)

Local stores hiring display workers.

Write to:
Society of Illustrators
128 East 63rd Street
New York, NY 10020

Evaluation: Class and individual projects.

Comments on use:

Subject Area(s) Mathematics

Unit(s) Marketing and Distribution Careers
Stock, Shipping, or Receiving Clerks

Objective(s):

Students will have an idea of making and compiling information necessary to do satisfactory work, be able to prepare an account record of goods received against the shipping invoice, condition of goods received, proper storage, date, and time or dates on certain goods, be able to set up a copy of a receipt which would include all information needed by truck drivers from a receiving clerk.

Procedure:

The teacher will direct, discuss, and/or supervise activities related to being a Stock, Shipping, or Receiving Clerk in the area of mathematics.

Prepare a make believe bill of loading, a detailed list of goods which will be sent to a customer.

Make a chart of the duties of a shipping clerk.

a. See that fragile things are secure.
b. Know the cost and time needed for the delivery.
c. Make up duties of lead shipping clerk or one working under a warehouse manager.

Make a check list which would be usable to a receiving clerk.

a. Checks items against bill of loading or shipping invoice.
b. Make sure goods are received in good condition.
c. Notes date, time, proper storage for articles, etc.

Make a receipt which a truck driver would be given for materials received by the receiving clerk.

Make a list of ways receiving, shipping and stock clerks work together.

Look up freight and postal rates, record some weights and put down cost of the shipment.

Resources and Materials:

Stock Clerk (pamphlet)

Can I Be An Office Worker? (Pamphlet)

Local businesses hiring clerks

Write to:
Material Handling Institute
1326 Freeport Road
Pittsburg, Pennsylvania 15238

American Warehousemen's Assoc.
222 West Adams Street
Chicago, IL 60606

Committee on Careers in Retailing
National Retail Merchants Assoc.
100 West 31st Street
New York, NY 10001

National Assoc. of Wholesalers
1725 K Street
N.W. Washington, D.C. 20006

Filmstrips:
"Elements of Design"
"Principles of Design"
"Summary of Design"

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Marketing and Distribution Careers
Stock, Shipping, or Receiving Clerks
p. 2

Objective(s):

Procedure:

Prepare a list of items the stock clerk in a hospital might use. This list should be for items both entering and leaving stock room.

Resources and Materials:

"What is Behavior"
"Conduct and Behavior"

Poster:
Marketing and Distributive Careers

Popeye and Marketing and Distribution Careers, King Features Syndicate
New York, NY 1973

Film:
"This Business of Numbers"
16mm, color, sound, 20 min.
BK 2 weeks, in advance
Pay return postage
UNIVAC--Division of Sperry Rand
Film Library
Advertising and Sales Promotion
P.O. Box 8100
Philadelphia, Pennsylvania 19101

"The Pacesetter in Aisle Number 3"
16mm, color, sound, 15½ min.
Pay return postage, General Mill Inc
Film Library
920 Wayzata Boulevard
Minneapolis, Minnesota 55440

Evaluation:

Class and individual projects

Comments on use:

Charldine Smart

Subject Area(s) Mathematics

Unit(s) Marketing and Distribution Careers
Insurance Salesperson

Objective(s):

Students will understand and know there is financial security against damages to the policy holder's property, and this is to protect him when he is responsible for damages to other people's property, be able to work well with numbers relating to percent accounting and finance charges, etc. Example: $10,000 at 7% + $400 x 12 = ?, gain some experience of working carefully with records which they have set up.

Procedure:

The teacher will direct, discuss, and/or supervise activities related to being an Insurance Salesperson in the area of mathematics.

From local insurance agents get some blank forms and sell the insurance among the students.

Sell some life insurance to classmates or faculty members.

Try to sell some property and liability insurance.

Set up a plan for financial protection for a man and his family.

Make up a record of insurance sold, financial statement, etc. of their own sales.

Resources and Materials:

Houlehen, Rob't. J.
The Battle for Sales

Stone, M.F.
Life Insurance

Careers in Insurance Selling

Invitation to Youth: Careers in Life Insurance

Insurance Careers (periodical)

Local Insurance Agency

Kit:
2 records, 2 filmstrips
Career Surprises Auto. Insurance

Film:
"In Common Cause"
16mm, color, sound, 22 min.
Reserve in advance, pay return postage
Modern Talking Picture Service
3 East 54th Street
New York, NY 10022

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Marketing and Distribution Careers
Routeman or Delivery Man

Objective(s):

Students will be able to check the amount of merchandise in his truck and to keep a record of their business transactions, be able to have a complete record of daily deliveries, be able to replace depleted stock and keep a record of the merchandise which goes into a vending machine, be able to read and/or make a chart of dry cleaning for a typical route truck.

Procedure:

The teacher will direct, discuss, and/or supervise activities related to being a Routemen or Delivery Man in the area of mathematics.

Make a list of merchandise on a delivery truck.

Make a list of payments collected and keep a record of transactions for one week.

Make a list of items to be checked in at plant after completing the day and make a record of money to be turned into cashier.

Make a list of products to be delivered day by day.

Make a mock chart on vending machines which sell foods.

Make a list of money removed from each machine.

Make a chart on a typical day for a dry-cleaning routeman, such as marking soiled articles, notes of the type of stains, or special processes such as waterproofing.

Make an itemized bill and attach to cleaned garments.

Resources and Materials:

Rawson, C.B.
Opportunities in Motor Transportation.

Routeman (pamphlet)

Kit
Job Experiences
Truck Driver

Local dry cleaners

Local businesses hiring delivery men.

Write to:
United Parcel Service
1001 Second Avenue North
Minneapolis, MN 55405

National Professional Driver
Education Assoc.
1625 North Industrial Bld.
Dallas, TX 75207

Film: The Truck Driver
16mm, color, sound, 16 min.
Order 3 weeks in advance, pay return postage. American Trucking Assoc., Inc., 1616 P St., N.W. Washington, DC 75207

Evaluation:

Comments on use:

Charldine Smart

Subject Area(s) Mathematics

Unit(s) Environmental Careers

Objective(s):
Students will know how to deal with basic laws of the physical world, be able to do research designed to increase man's knowledge of the properties of matter and energy, from applied research, use the knowledge gained from this to develop new products and/or processes, know something about the three major physical science occupations--chemist, physicist, astronomer.

Procedure:
The teacher will direct, discuss, and/or supervise activities related to being a Physical Scientist in the area of mathematics.

Work problems related to any situation in our physical world.

Keep a record of any activity of students choice, such as feeding a pet, caring for a dairy animal, et. and from the record of time of feeding, amount, etc. be able to design any changes with improvement for the situation.

Student or students could prepare a lesson to present to other members of the class, role playing as teacher.

Do a chart or graph on the various ways foods are processed and approximate percentage in each category.

Set up or work five problems related to each of the following areas: chemist, physicist, astronomer.

Resources and Materials:
Frifield, D.R.
Careers in Geophysics (bulletin)

Pollack, P.
Your Career in Physics

Opportunities for Women in the Field of Physics

Hammond, M.
Occupational Goals for College Students in Physical Scientist

Employment Outlook for Physicists

Education Requirements for Employment of Geophysicists
(Above 2 are from the Bureau of Labor Statistics)

Filmstrips:
"Elements, Compounds, and Mixtures"
"Fish and Amphibians"

Evaluation:

Class and individaul projects

Comments on use:

Charldine Smart

Subject Area(s) Mathematics

Unit(s) Environmental Careers
Forestry Technician or aid

Objective(s):

Students will understand things involved in managing and caring for lands and their resources including; be able to collect and record data such as tree heights, diameter, and mortality, be able to keep a ratio of tree loss to total supply of trees. Figure percentage from this for period of 3 years, be able to collect records from rain gauges, be able to read a streamflow recorder, rain gauge, soil moisture instruments, etc.

Procedure:

The teacher will direct, discuss, and/or supervise activities related to being a Forestry Technician or Aid in the area of mathematics.

Make a diagram of a forest and a chart to go with it, having a plan for harvesting and cutting trees, purchases, and sale of trees and timber, processing reforestation, such as reseeding and replanting.

Work math problems related to ratio of the height of a tree to the shadow of the tree.

Tree shadow in keeping a record of tree heights.

a. Do some problems related to the diameter of circular objects.
b. Write a paper on several kinds of trees and state the average life of each.

Work problems set up related to ratio of trees lost from disease to total number of trees. Figure from this percentage of loss due to disease.

Set up rain guage at school and record rainfall monthly for 3 months.

Take a field trip and have a streamflow recorder. Record these findings.

a. Record the rain fall from rain guage.
b. Record findings from a soil moisture instrument.

Resources and Materials:

Shirley, H.L.
Forestry & It's Career Opportunities

Greeley, W. B.
Forests & Men

Careers in Forestry
U.S. Dept. of Agri.

Floherty, J. J.
Forest Ranger

Splaver, S.
Forester

Forester (pamphlet)
Chronicle Guidance
Publications

McCormick, Jack
The Life of the Forest

Filmstrip:
"Reptiles and Birds"

Record:
"Forest Conservation Today"

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Environmental Careers
Forestry Technician or Aid, p. 2

Objective(s):

Procedure:

Resources and Materials:
Films:
"The Forever Living Forests"
16mm, color, sound, 25½ min.
BK one month in advance, pay return postage
California Redwood Association
617 Montgomery Street
San Francisco, CA 94111

"Science Study and Skills"
16mm, color, sound, 11 min.
For rental fee and nearest library write to:
Coronet Films
Sales Department
Coronet Building
Chicago, IL 60601

Write to:
Forest Service
United States Dept. of Agriculture
Washington, D.C. 20250

Society of American Foresters
1010 16th Street
N.W. Washington, D.C. 20036

American Forest Products Industries, Inc., 1835 K St., N.W., Washington, DC 20036

Evaluation:

Comments on use:

Charldine Smart

Subject Area(s) Mathematics

Unit(s) Environmental Careers
Range Manager

Objective(s):
Students will be able to set up a plan or plans for grazing livestock on range and at same time have high production yet preserve soil and vegetation using ratio, be able to set up a working plan for restoring deteriorated rangelands through seeding or plant control, be able to understand the multiple use of rangelands and how closely a ranger must work with other related fields, such as wildlife and watershed management, land classification, forest management, and recreation, give a report written or oral related

Procedure:
The teacher will direct, discuss, and/or supervise activities related to being a Range Manager in the area of mathematics.

Set up a plan of how to manage, develop, and protect the forest lands of 10 acres plot of ground near students homes.

Set up a statistical chart of number of acres of land, number and type of animals to be grazed, and the length of growing season.

Write out a plan for restoring rangelands as to either type of seen and/or plants to be used.

Make a booklet with rules and regulations for forest land designated as recreation areas. Include costs if any are to be included.

Student can either do research and/or have a guest speaker lecture on the subject of range maintenance and improvement.

Prepare a report to give before a group on how to conserve wildlife habitats and how to use rangeland to graze cattle.

Make a chart on when to close an area to stockmen who have over used the land, and include steps to be taken

Resources and Materials:
Floherty, J. J.
Forest Ranger

Shirley, H. L.
Forestry & Its Career Opportunities

Greeley, W. B.
Forests & Men

Splaver, S.
Forester

Park Ranger
(Chronical Guidance Pub.)
F
Forester
(Chronical Guidance Pub.)

Filmstrips
(Boonslick Reg. Lib.)
1. Bulldozed America
2. Small Animals of the Plains
3. Nature's Half Acre
4. Animals Town of the Prairie
5. The Litterbug
6. National Parks: Our American Heritage
7. Animal Homes
8. Our Vanishing Land

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Environmental Careers
Range Manager, p. 2

Objective(s):
to range maintenance and improvement by collecting data.

Procedure:

to restore the damaged land. Include any useful mathematical ideals.

Resources and Materials:

9. Wildlands--Our Heritage

Filmstrips
"The Joint Legged Animals"
"National Parks"

Write to:
Society for Range Management
2120 South Birch Street
Denver, Colorado 80222

Bureau of Land Management
Denver Service Center
Federal Center Building 50
Denver, Colorado 80225

Conservation Occupations -
Foresters, Forestry Aides, Range Managers (Bulletin No. 33) Cost 15c
Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Film
"Endless Chain"
16mm, color, sound, 28 min., BK 3 weeks in advance, write to:
United States Atomic Energy Comm.
Chicago Operations Office
Office of Information
9800 South Cass Avenue
Argonn, IL 60439

Evaluation:

Class and individual projects

Comments on use:

Charldine Smart

Subject Area(s) Mathematics

Unit(s) Environmental Careers
Meteorologist

Objective(s):
Students will be able to analyze past records on wind, rainfall, sunshine, temperature, and other areas to determine the general pattern of weather which makes up the area's climate by collecting data, be able to devise a mathematical model of atmospheric motion as an aid to changing weather conditions, be able to file and tabulate large amounts of data, have some understanding of being a well-trained meteorologist and being business administer of their own weather consulting service.

Procedure:

The teacher will direct, discuss, and/or supervise activities related to being a Metorologist in the area of mathematics.

Record information from daily papers or records of past weather in own area for a one year period and record general patterns which seem to prevail.

Set up a model, table scene, small display, etc. of atmospheric motions and how this affects weather conditions.

Make a file of weather map, charts, etc. related to some area of weather, and make some mathematical tabulations of this data on a separate sheet or sheets.

Do a research paper on amount and kind of training needed to set up and/or work with a weather consulting service.

Have a guest speaker speak to the class. Examples from commercial airlines, private companies, college or university.

Resources and Materials:

Forrester, Frank H.
The Real Book about Weather

Larlin, A. V.
Meteorologist
Guidance Centre (Canada)

Lehr, Paul, E.
Weather: Air Masses
Clouds--Rainfall--Storms--
Weather Maps--Climate

Acler, Irving
Weather in Your Life

Filmstrip
(Boonslick Reg. Lib.)
Eyes in Outer Space

Filmstrips
Hydrogen, Oxygen, and Water

Why Does It Rain?

"Winds That Kill"
16mm, black & white, sound, 13½ min.
Pay return postage

Evaluation:

Comments on use:

Subject Area(s) Mathematics

Unit(s) Environmental Careers
Meteorologist, p. 7

Objective(s):

Procedure:

Resources and Materials:
Modern Talking Picture Service
2323 New Hyde Park Road
New Hyde Park, NY 11040

Write to:
American Meteorological Society
45 Beacon Street
Boston, MA 02108

American Geophysical Union
2100 Pennsylvania Avenue
N.W. Washington, D.C. 20037

Evaluation:

Class and individual projects

Comments on use:

Subject Area(s) Mathematics

Unit(s) Environmental Careers
Life Scientist

Objective(s):
Students will arrive at a better understanding of the relationship between plants and the environment, also about the structure of plants and plant diseases, gain a better understanding of air and water pollution on plant life, get a basic ideas as to the temperature at which some fish stop laying eggs, other eggs die at certain temperatures, understand why the industrial mercury which sinks to the bottom of a waterway changes chemically and is eaten by fish which is dangerous for human consumption.

Procedure:

The teacher will direct, discuss, and/or supervise activities related to being a Life Scientist in the area of mathematics.

Make a study of living organisms and processes which determine the nature of life.

a. Men and microbes
b. Health and disease
c. Environmental influence

Record and/or interpret above ideas.

Write a report on how air and water pollution affect plant life.

Make a graph for the fish of the local area which includes water temperature for fish laying eggs.

Make a list of the density of various liquids.

Resources and Materials:

Careers in Natural Sciences
(Pamphlet)

Films:
(Boonslick Reg. Lib.)
"Universe"
"Wonders of a Country Stream"
"Problems of Conservation-Air"
"Why Explore Space?"
"Downstream"

Filmstrips
"Mammals"
"How Animals Are Classified"
"Changes In Matter"
"Fish"

Evaluation:

Class and individual projects

Comments on use:

Charldine Smart

Subject Area(s) General Science

Unit(s) Work and Machines

Objective(s): Students will become familiar with information relative to work and machines and see the relationship between energy, force and work.

Procedure	Resources and Materials:
Students will read reference material concerning work and machine.	Modern Physical Science, Holt, Rinehart, Winston, "Work, Power and Energy"
Students will view films relating to energy, forces and work.	Science films. "Forces," "What Is Uniform Motion," "Energy and Work"
Students will calculate work by lifting, pulling and pushing different objects.	Any object may be used, distance measured with a ruler and force with a spring scale from physics laboratory.
Students will see models of the six simple machines.	Models may be provided, but for more involvement students can make them.
Students will use the simple machines to move objects and calculate the work done and the effort force gained.	Any classroom objects may be used and the machines available from physics laboratory.
Students will visit the school maintenance shop and industrial arts department.	Maintenance shop and industrial arts department
Students will visit a garage.	Local garage or a filling station

Evaluation: Class and individual projects.

Comments on use:

Fred Lovercamp

Subject Area(s) Science

Unit(s) Work - Hydraulics

Objective(s):

Students will see hydraulics as a field with new career potentials. Students will be able to calculate the mechanical advantage of the jack. Students will appreciate fluids as agents of work and a power medium. Students will understand reason for water towers, precautions in deep sea diving, and the structure of submarines.

Procedure:	Resources and Materials:
Students will read material on behavior of fluids.	Physical Science: A Search for Understanding. Brown & Anderson Lippincott pp. 83-89
Students will experiment with surface tension and cohesion and adhesion.	(a) Glass and other containers. Wetting agents. (b) Various adhesives.
Students will experiment with a simple hydraulic jack.	(a) Hydraulic jack (b) Cross sectional diagram of hydraulic jack (c) Demo device showing hydraulic system using pistons of two sizes.
Class will be visited by a hydraulic repairman.	(a) Local truck or farm tractor repairman (b) Hydraulic engineer
Students will take a field trip to see a hydraulic hoist system at work.	(a) Farm tractor (b) Service station automobile hoist
Students will see a power steering unit cutaway, diagram, or a film on hydraulic motors.	(a) General motors (b) Power mechanics instructor
Students will do an experiment showing the effect of depth of liquid on pressure.	Tall container, pressure measuring device.

Evaluation:

Class and individual projects

Comments on use:

98

Edgar A. Phillips

Subject Area(s) General Science

Unit(s) Light

Objective(s): Students will become aware of the importance of light in daily life; see the application of light in photography and optometry; better understand the effects of bending light rays; and see the application of light in common use and become aware of the career possibilities in this area.

Procedure:	Resources and Materials:
Students will read reference material about light.	Modern Physical Science, Holt, Rinehart, Winston, "The Nature of Light," "Refraction of Light," "Color"
Students will view films concerning light.	Science films: "How To Bend Light" and "Light and Color"
Visit the school photography department of a local photgraphy studio.	School photography dept. Interstate Studio, Sedalia, MO
Students will be visited by photographer	Representative of Interstate Studio
Students will examine and note the effect of a prism, concave and convex lenses.	These materials provided by the physics laboratory
Students will be visited by an optometrist.	A local optometrist

Evaluation: Class and individual projects.

Comments on use:

Fred Lovercamp

Subject Area(s) Science

Unit(s) Heat - Temperature vs. Quantity

Objective(s):

Students will learn the difference between temperatures , degrees, and calories or BTU's. Students will see that there are differences between quantities and intensities of heat and the practical application the heat transfer principles. Students can outline how school is heated. Students can list 5 areas of career opportunities in heating and cooling industry. Students will become aware of ways to save money and our dwindling supply of fuel.

Procedure:

Students will read about heat and temperature in a book.

Students will make a water thermometer and calibrate it.

Students will experiment with heating different quantities of water for equal lengths of time.

Students will tour the school heating plant.

Students will make a field trip to heating cooling dealer.

Class will be visited by a heating engineer.

Students will either design a heating system or describe heating system in their own home.

Students will write a report on the conservation of heat in their homes.

Resources and Materials:

(a) Physical Science: A Search for Understanding Brown & Anderson Lippincott Co. pp. 109-24
(b) Science in Modern Life Mallinson. Ginn & Co. pp. 336-48

Glass tubing, ice, salt, and burner.

Beakers, burners, thermometers. Preferably a lab.

School heating engineer.

Local cooling and heating place of business.

(a) Local heating engineer or contractor.
(b) Tech. school instructor

Science in Modern Life pp. 360-64

(a) Parents
(b) Science in Modern Live pp. 359-60
(c) Local builder

Evaluation:

Class and individual projects

Comments on use:

Edgar A. Phillips

Subject Area(s) Science

Unit(s) Meteorology - Climate

Objective(s):
Students will define climate as an average of weather conditions for an area. Students will have general knowledge of the great variety of climate in the U.S. Students will be aware of the tremendous effect of climate on the kinds of jobs and leisure time activities available. Students will be aware of strides being made in long range forecasting.

Procedure:
Students will read and study material from a reference book.

Students will prepare a chart of average yearly rainfall, January and July temperatures for the United States.

As a class project students will examine and/or prepare a relief map of the United States and try to predict the various climates of the country by looking at the physical features.

Students will make a list of jobs available, food supply, cost of living, recreation, and other factors in everyday life as affected by climate in various areas of the U.S.

Students will locate a long range weather forecast map in a newspaper or magazine. Their will watch and see how accurate it is in the ensuing days.

Resources and Materials:
Science in Modern Life

(a) Geography text
(b) Set of encyclopedias
(c) Personal experience

(a) Relief map
(b) Atlas

(a) Geography text
(b) Set of encyclopedias
(c) Personal experienc

(a) U.S. News & World Report
(b) Mo. Ruralist

Evaluation:

Class and individual projects.

Comments on use:

Subject Area(s) Science

Unit(s) Meteorology - Weather

Objective(s):

Students will define various weather terms including: weather patterns, meteorologist, weather predictions, relative humidity and temperature change in producing precipitation, the role of the jetstream in development of weather patterns, prevailing winds, and the importance of taking cover during storm warning. Students will name the major factors in weather formation.

Procedure:

Students will read material in a book.

Class will subscribe for weather maps and/or cut out the daily weather maps from the newspaper. They will trace the movements of the highs and lows on the maps, noting the direction and speed of their movement. They will attempt to predict the next day's weather.

Students will visit a weather station.

Students will visit a weather radar station or be visited by a weather radar technician.

Students will record humidity, temperature, pressure, and precipitation each day.

Students will do an experiment to determine dew point.

Students will be visited by a pilot or meteorologist who know something about jet streams.

Students will fill a balloon with helium or hydrogen (preferably helium) with a self-addressed postal card attached and will release it.

Students will bring pictures of destruction caused by hail, tornadoes, or hurricanes.

Resources and Materials:

Science in Modern Life
Mallinsen & Meppelink
Ginn & Co. pp. 252-269

US Weather Bureau Regional Office
Federal Office Bldg.
601 E. 12th Street
Kansas City, MO

K.C. Star

(a) Local weather Bureaus Station
(b) Weather hobbyist.

Local weather radar installation.

Rain gauge, psychrometer, barometer and wind vane.

Shiny cup, ice, salt, thermometers

(a) meteorologist
(b) local airport

plastic bag or large rubber balloon. Zinc-acid hydrogen generator or helium supply.

Newspapers and magazines from home.

Evaluation:

Class and individual projects.

Comments on use:

Edgar A. Phillips

Subject Area(s) Science

Unit(s) Heat - Expansion and Specific Heat

Objective(s):

Students will understand heat on the molecular level, that different substances have different heat holding capacities, bimetallic thermostats, and engineering for thermal expansion due to weather changes.

Procedure:

Students will read a textbook about heat; particularly the "caloric theory" and von Rumford.

Students will experiment with heating different metals, by finding calories of heat needed to raise equal masses of different metals in temperature.

Students will experiment with expansion of various solid, liquid, and gaseous materials.

Students will examine, roads, buildings, bridges.

Students will be visited by an architect or civil engineer.

Resources and Materials:

(a) Physical Science: A Search for Understanding. Brown & Anders Lippincott & Co. pp. 121-42
(b) Science in Modern Life Mallinson. Ginn & Co. pp. 341-42 345-48

Samples of different metals, calorimeters or styrofoam cups, thermometers.

(a) IPS Thermal expansion kit.
(b) Syringes for gas expansion experiment.
(c) Glass tubing and test tubes for liquid expans.
(d) IPS, Haber-Schaim, et. al. Prentice-Hall Inc. 2nd Ed. pp. 31-40

(a) Local Concrete roads
(b) Local bridges
(c) School building

(a) Local architect
(b) Local engineer

Evaluation:

Class and individual projects

Comments on use:

Edgar A. Phillips

Subject Area(s) Science

Unit(s) Heat - Change of State

Objective(s):

Students will get an overview of the many practical ramifications of state change including: boiling point, the role of state change in air conditioning, poser generation, cnd in function of heat engines.

Procedure:

Students will read about boiling and freezing in a book.

Students will experiment with boiling water to see what happens to the temperature after boiling occurs. They will also try boiling water at different pressures.

Students will experiment with a wet-dry bulb thermometer.

Students will be visited in class by person knowledgable in refrigeration.

Students will visit steam power plant.

Students will study diagrams of various types of heat engines. (Models if available)

Resources and Materials:

(a) Science in Modern Life
Mallinson. Ginn & Co. pp. 365-66, 343-45
(b) Physical Science
Brown & Anderson. Lippincott pp. 119-21, 130-40

(a) Ordinary lab. Glassware
(b) Vacuum pump if possible

(a) Hygrometer
(b) Sling Psychrometer

(a) Air conditioner installer
(b) Refrigerator repairman

Local electric power plant

(a) Diagram of model of piston petrol. engine
(b) jet
(c) gas turbine
(d) steam

Evaluation:

Class and individual projects

Comments on use:

Edgar A. Phillips

Subject Area(s) General Science

Unit(s) Air

Objective(s): Students will become familiar with various gases and particularly the composition of air; experience the importance of and application of uses of various gases and see the workers involved in the production and distribution of oxygen.

Procedure:	Resources and Materials:
Students will read reference material concerning gases.	Modern Physical Science, Holt, Rinehart, Winston, "The Nature of Some Common Gases"
Students will view films about gases.	Science films: "Air All About Us," "Laws of Gases," "Hydrogen," "Oxygen"
Students will experiment by: (a) burning of a candle flame in presence and absence of air; (b) heating mercuric oxide to generate oxygen; (c) prepare carbon dioxide by combining baking soda and vinegar and submerge a burning splint in the gas formed.	Necessary chemicals can be secured from the Chemistry Laboratory
Students will visit a commercial liquid oxygen plant.	Mo-Ox Company, Sedalia, MO

Evaluation: Class and individual projects.

Comments on use:

Fred Lovercamp

Subject Area(s) General Science

Unit(s) Measurement

Objective(s): Students will become familiar with information concerning measurement of matter; learn about the metric system of measurement; and be made aware of the use of the metric system as related to their health and the possibility of pharmacy as a career.

Procedure:	Resources and Materials:
Students will read reference material concerning measurement.	Modern Physical Science, Holt, Rinehart, Winston, "Measurement of Matter"
Students will view film concerning measurement.	Science film: "The Metric System"
Students will practice measurement activities in the laboratory.	Instruments for measuring both in English and metric systems available in physics laboratory
Students will compile list of as many things as they can find with quantity stated in metric system.	
Students will be visited by pharmacist.	Local pharmacist

Evaluation: Class and individual projects.

Comments on use:

Subject Area(s) General Science

Unit(s) Building Materials

Objective(s): Students will become familiar with information about different types of building materials; see the numerous kinds of building materials and the workers involved in their sale; be exposed to the many job opportunities in the construction business; and see the production of concrete building materials and the employment possibilities.

Procedure:	Resources and Materials:
Students will read reference materials concerning building materials.	Modern Physical Science, Holt, Rinehart, Winston, "Materials for Building"
Students will visit a lumber yard.	Sutherland Lumber Co., Sedalia, MO
Students will be visited by a representative of a construction firm.	Tempel-Callison, Sedalia, MO Dean Construction Co., Sedalia, MO
Students will visit a concrete production facility.	Howard Construction Co., Sedalia, MO

Evaluation: Class and individual projects.

Comments on use:

Fred Lovercamp

Subject Area(s) Science

Unit(s) Geology - Forces shaping the Earth's Surface

Objective(s):

Students will be aware of order in nature and that there are counteracting forces working on the Earth's crust. Students will become aware of the effect of erosion on agriculture and the economy. Students will know why topography is different in different areas. Students will learn of available careers in geology.

Procedure:

Class will study and be tested over material from a reference book about aggradation and degradetion of the earth's surface.

Students will take pictures or make written reports on the effects of both recent and ancient erosion in their own community.

Students will present methods of retarding weathering and erosion where desirable to do so.

Students will collect pictures of Grand Canyon and other areas around the country and try to identify the geologic forces which formed them.

Class will be visited by a physical geologist.

Students will write reports about earthquakes and volcanoes.

Students will visit a seismograph if one is available or will build a model of one.

Students will do a soil profile.

Resources and Materials:

Science in Modern Life
Mallinson & Meppelink
Ginn & Co. pp. 150-166

Camera

(a) Soil conservation agent
(b) Agri. teacher

(a) Travel folders from the Chamber of Commerce and Tourism Depts. of the various States.
(b) National Geologist Mag.

(a) local person who knows geology
(b) Oil Co. Geologist

Any set of Encyclopedias

Earthquake reporting laboratory

(a) Shovel
(b) Unexcavated or untilled area

Evaluation:

Class and individual activities

Edgar A. Phillips

Comments on use:

Subject Area(s) Science

Unit(s) Gravity - Weight

Objective(s):

Student will have some concept of the Inverse Square Law. Students will recognize that vertical and horizontal motion are independent. Students will understand that acceleration follows the same rules as deceleration.

Procedure:

Read about gravity in a resource book.

Students will experiment with the acceleration of a freely falling object.

Demonstration will be given to the class showing different shape and mass objects falling in a cacuum.

Demonstration will be given showing acceleration of gravity and horizontal motion.

Students will calculate the speed of a baseball as it leaves their hand and how high it goes.

Students will see a film on rockets and satellites.

Students will launch model rockets that they build themselves.

Students will write a short report on terminal velocity of falling bodies.

Resources and Materials:

Physical Science: A Search for Understanding. Brown & Anderson Lippincott pp. 90-106

(a) Special acceleration of gravity apparatus.
(b) Door bell and carbon tape.

Long glass vacuum tube designed for "Galileo's experiment"

(a) Metal tube (pipe) and two steel bearings
(b) Special apparatus

Baseball and measuring tape, also homemade sextant.

Free film catalog

Model rocket supplier.

Local parachute enthusiast

Evaluation:

Class and individual projects

Comments on use:

Subject Area(s) Science

Unit(s) Geology - Topography maps

Objective(s):
Students understand the meaning of topography and how it affects the society of the people. Students will be familiar with topographic terms. Students will be able to use maps more efficiently, including road maps. Students will understand basic cartography. Student will see how maps are made. Students will know fundamentals of land description used in the sale of land. Students will learn basics of surveying, mapping elevations, and contour lines.

Procedure:	Resources and Materials:
Students will study topography in a good textbook.	Exploring Earth Science Thurber & Kilburn Allyn & Bacon pp. 396-407
Students will study topographic maps and will find various elevations and physical and man-made features on them.	(a) U.S. Geological Surv. Denver, Colorado (b) Mo. Geol. Survey, Rolla, MO.
A map maker may visit the class.	(a) Geol. Survey employee (b) Army engineer from Corps of Engineers
Students may visit map making office.	(a) Army Map Service, 601 Hardesty, K.C., MO. (b) Geol. Surv. Map agency (c) Local map maker
Person with knowledge of U.S. Standard Land Survey will visit the class.	(a) Local abstractor (b) County recorder or collector's office employee
The class will be visited by a surveyor.	(a) County Surveyor (b) Professional Surveyer
Students will try surveying, and drawing a profile.	(a) Surveyor's chain (b) Transit level (c) Surveyor's rod
Class will be visited by ag. teacher of person who can lay out contours.	Ag. Teacher

Evaluation:

Class and individual projects

Comments on use:

Subject Area(s) Science

Unit(s) Matter - Physical Properties

Objective(s):

Students will know the difference between weight and mass and that matter has 3 forms, each having volume. They will know the difference between square measure and cubic measure. Students will know about weighting in the metric system. Students will be aware that density considers both mass and volume. Students will know that state changes, chemical changes, and dissolving does not appreciably change the quantity of matter. Students will see the difference between pure science and applied science careers in working with matter.

Procedure:

Students will read textbook material on the subject.

Students will experiment with volume.

Students will learn to use balance scales.

Students will do an experiment in which they find the density of objects.

Students will do experiments in buoyancy.

Students will experiment with conservation of mass.

Students will be visited by a physicist and engineer.

Resources and Materials:

Physical Science: A Search for Understanding. Brown & Anderson Lippincott pp. 40-50

Science in Modern Life
Mallinson. Ginn & Co.
pp. 292-94, 297-300.

Plastic cubes volume kit.

Balances, metric wts.

Graduated cylinder, scales, irregular shaped objects regular shaped objects, ruler.

Toy boats, various heavier and lighter than water objects. Calibrated liquid container.

IPS. experiments 2.7 through 2.13. pp. 16-21

(a) local physics prof.
(b) local engineer.

Evaluation:

Comments on use:

Subject Area(s) General Science

Unit(s) Fuels

Objective(s): Students will become familiar with information concerning fuels; learn the process of distribution of natural gas and the different types of workers involved in this process; be provided information about the steps in production of fuels from crude oil and the many and varied career opportunities involved; and become aware of the many types of fuels, their uses and the workers necessary in providing their availability.

Procedure:	Resources and Materials:
Students will read reference material about fuels.	Modern Physical Science, Holt, Rinehart, Winston, "Fuels"
Students will visit a natural gas supplying facility.	Panhandle Eastern Pipeline, Houstonia, MO
Students will be visited by a representative of a major oil company.	Phillips Petroleum Co.
Students will examine and identify different types of fuels.	Readily accessible specimens of: hard coal, soft coal, charcoal, coke, wood, fuel oil, kerosene, gasoline, and propane

Evaluation: Class and individual projects.

Comments on use:

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Subject Area(s) General Science

Unit(s) Rocks and Minerals

Objective(s): Students will become aware of kinds, sources and classification of rocks and minerals; be able to identify various kinds of rocks and minerals; see the methods of obtaining rock, its preparation and distribution for use and the workers involved in these processes; be more cognizant of the uses of rocks and minerals.

Procedure:	Resources and Materials:
Students will see film concerning rocks and minerals.	Science film: "Understanding Our Earth: Rocks and Minerals"
Students will see a rock and mineral collection.	Collection available in local school system
Students will visit a rock quarry.	Students will visit a rock quarry
Students will do research on kinds of rocks and minerals and their uses.	Local school library Sedalia Public Library Boonslick Library, Sedalia

Evaluation: Class and individual projects.

Comments on use:

Fred Lovercamp

Subject Area(s) General Science

Unit(s) Metals

Objective(s): Students will become familiar with information about metals and metallurgy; discover the properties of metals; see the uses of metals in manufacturing and the workers involved in the process and become knowledgeable of properties and uses of precious metals and the facets of the jewelry business.

Procedure:	Resources and Materials:
Students will read reference material concerning metals.	Modern Physical Science, Holt, Rinehart, Winston, "Metallurgy of Iron," "Metallurgy of Other Common Metals," "Precious Metals and Other Alloys"
Students will view film concerning metals.	Science film: "Metals and Non-Metals"
Students will visit a factory using metals in producing products.	Rival Manufacturing Co., Sedalia, MO
Students will be visited by a local jeweler.	Hudson Jewelry, Sedalia, MO

Evaluation: Class and individual activities.

Comments on use:

Subject Area(s) General Science

Unit(s) Meteorology

Objective(s): Students will see how weather predictions are made and how this affects everyone's activities, understand the workings of common weather instruments, be able to relate atmospheric conditions to weather and apply this knowledge to personal activities; be able to intelligently interpret the weather report, and see an actual weather station in operation, and see possibilities of related jobs.

Procedure:	Resources and Materials:
Students will view film about weather forecasting.	Science film: "How Weather is Forecast"
Students will set up a weather station, using instruments they make when possible, i.e., hygrometer, psychrometer, wind vane.	Materials to be provided in classroom for construction of weather instruments to include thermometers, test tubes and related materials
Students will be provided with available reference material about weather, its changes, reasons for change and prediction of change.	U. S. Dept. of Commerce, Washington, DC Weather maps, pamphlets on storms and weather conditions
Students will keep record of observations of daily weather conditions for a period of one week and on a map of the U. S. show these conditions and predict weather.	Local newspaper K. C. Star-Times
Visit a local weather observation station.	Sedalia Water Dept. Radio Station KSIS

Evaluation: Class and individual projects.

Comments on use:

Fred Lovercamp

Subject Area(s) General Science

Unit(s) Water

Objective(s): Students will understand the chemical properties of water, its importance and how it is distributed for use, know principles involved in water purification, and understand how the consumer pays for water used, and also the types of work involved in calculating and distributing bills.

Procedure:	Resources and Materials:
Students will view films concerning the properties and uses of water.	Science films: "Properties of Water," "Water for the Community"
Students will read reference material concerning water and its treatment for use and consumption.	Modern Physical Science, Holt, Rinehart, Winston, "Water and the Chemistry of Its Treatment"
Students will perform laboratory experiments to purify water by sedimentation, filtration and distillation and the effect of hard water on effectiveness of detergents as compared to soft water.	Sedimentation Filtration Distillation Detergents in hard and soft water
Students will take a field trip to water plant.	Water plant
Students will figure a monthly water bill.	Rate sheets from water company

Evaluation: Class and individual projects.

Comments on use:

Fred Lovercamp

Subject Area(s) General Science

Unit(s) Electricity

Objective(s): Students will understand principles of electricity, know meaning of complete broken circuit by use of switch, meaning of and need for insulated wire and sound energy produced by electrical energy, and observe how electric power is generated and the numerous workers involved in getting the electric current to our homes.

Procedure:	Resources and Materials:
Students will view films concerning electricity and magnetism.	Science films: "What Is Electric Current?" "How to Produce Electric Current with Magnets," "Magnetic, Electric and Gravitational Fields"
Students will construct an electric bell circuit.	Students will be provided with insulated copper wire, push button switch, bell and 1.5 volt dry cell.
Students will be visited by an electrician.	Local commercial electrician
Students will visit an electric power plant.	Truman Dam, Warsaw, MO
Students will discuss how electricity affects their everyday life.	Appliances and uses in the home

Evaluation: Class and individual projects.

Comments on use:

Subject Area(s) General Science

Unit(s) Heat Energy

Objective(s): Students will be more familiar with meaning of terms heat, temperature, Btu, calorie, fuel, convection, radiation, conduction and heat energy; see operation of heating plant, fuel used, method of transfer throughout building, knowledge necessary for operation and equipment needed; see how heat is removed and the resulting ice and how it is used by them, even the cokes they drink; observe change of temperature as heat is added to ice, the heat coming from fuel, transferred; understand prices of different size units based on Btu's; learn of career possibilities in heating & air conditioning.

Procedure:	Resources and Materials:
Students will be provided with reference materials concerning heat, its meaning, sources, and uses.	Modern Physical Science, Holt, Rinehart, Winston, "Heat Energy"
Students will see the school heating system.	School heating system
Students will visit ice and cold storage plant.	Sedalia Ice and Cold Storage Plant
Students will heat ice to boiling water to observe transfer of heat. This change to be plotted by graph.	Use of ice, ringstand, beaker, alcohol burner, watch, thermometer and graph paper
Students will secure prices of different sizes of heating units and air conditioners.	Local business establishments and ads in local newspaper
Students will be visited by heating and air conditioning company representative.	Local representative Sedalia Heating and Air Conditioning

Evaluation: Class and individual projects.

Comments on use:

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Subject Area(s) General Science

Unit(s) Sound

Objective(s): Students will learn relationship between music and noise; learn that sound and vibrations will be reinforced; see transfer of sound by telephone and the numerous job opportunities in this field and see the advancement of sound transfer accomplished through the years and how this also has brought about problems.

Procedure:	Resources and Materials:
Students will be provided with reference materials on wave motion, sound and music.	Modern Physical Science, Holt, Rinehart, Winston, "Wave Motion and Sound" and "Sound and Music"
Students will view films on sound waves and vibrations.	Science films: "Waves and Energy, "Vibrations"
Students will visit Southwestern Bell Telephone Comapny.	Bell Telephone Company
Students will discuss modern communication and use of sound. To include radio, telephone, television, music and noise pollution.	Visiting speaker from radio station, KDRO, Sedalia, MO

Evaluation: Class and individual projects.

Comments on use:

Subject Area(s) Science

Unit(s) Astronomy

Objective(s):

Students will be aware of some of aspects of the practical and mysterious manifestations of astronomy. Student will become aware in tools of astronomy which may lead to a career in astronomy or optics or leisure time activity. Students will know about movement of the earth on its axis, will understand how time zones are defined. Students will have some understanding of navigation by the heavenly bodies. Students will understand that many discoveries in astronomy have had practical applications.

Procedure:

Students will read about astronomy in a reference book.

The class will examine a telescope which a student will bring into class.

Students will draw a sky chart on a clear night and compare with sky chart from a different time of year.

An amateur astronomer or even a professional will visit the class.

Students will practice pinpointing locations on a map or globe by degrees latitude and longitude.

Students working in pairs will make a map of "perfect time zones" with only astronomy in mind. Using overlays they will superimpose Standard Time Zone map and observe differences. Then they will design a more practical time zone map than either of the above.

Class will see a demonstration illustrating eclipses.

Students will use a sextant to find positions of North Star and various other heavenly bodies.

(Do not allow students to look directly at the sun).

Students will make individual reports to the class about famous astronomers and the contributions that they made.

Resources and Materials:

Science in Modern Life
Mallinson & Meppelink
Ginn. pp. 14-59

Student with a telescope

Navigational charts

Local astronomer

Map or globe

(a) Text above
(b) Encyclopedia
(c) Atlas

Flashlight, globe, rubber ball.

(a) Sextant if available
(b) Homemade sextant, using a protractor and cheap telescope of refracting type.

Set of enclopedias.

Evaluation:

Class and individual activities.

Comments on use:

Subject Area(s) Science

Unit(s) Botany - Trees

Objective(s):

Students will have general knowledge of and an appreciation for trees and their uses. Students will know something about choosing, caring for, and protecting trees. Students will be able to identify some common Missouri trees. Students will get first hand knowled of careers in forestry, commercial tree utilization, and the timber industry.

Procedure:

Students will read and do some exercises of trees.

Students will hear guest speaker, from agency with information in horticulture of forestry.

Students will make a leaf collection.

Students will make a field trip to a local park or woods.

Students will view films with emphasis on:

a. forest protection
b. reforestation
c. lumber industry

Students will prepare radio or TV skit for local station on trees.

Students will have a speaker from lumber yard or other lumber industry.

Resources and Materials:

(a) Trees, Zim and Martin, Western Publishing Co. pp. 1-156
(b) Modern Biology Otto-Towle. Holt & Co. pp. 345-372

County ext. agent

Local woodlots

(a) Park
(b) Farm woodlot

Mo. Conserv. Comm.

Local station program director

(a) Local yard owner
(b) Sawmill operator
(c) Lumber products manufacturer

Evaluation:

Class and individual projects

Comments on use:

Edgar A. Phillips

Subject Area(s) Science

Unit(s) Exploration of Health Occupations

Objective(s):

To help students investigate and become familiar with various responsibilities associated with certain health occupations.

Procedure:

From previous compiled list, select by group preference 10 most frequently appearing health occupations.

Assign worksheet having students determine responsibilities and obligations of each occupation.

Discuss orally all points compiled by students.

Resources and Materials:

Lists from assignment No. 1

Occupational Handbook

Evaluation:

Comments on use:

Jane Parker

Subject Area(s) Science

Unit(s) Exploration of Health Occupations

Objective(s):
To make students aware of various occupations related to health occupations.

Procedure:
Discuss with students obvious occupations associated with health.

Make assignment.

Create list of 25 health occupations, other than doctor and nurse.

Resources and Materials:
Occupational Handbook

Dictionary

Evaluation:
Evaluate as to creativity and ingenuity of students.

Comments on use:

Jane Parker

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Subject Area(s) Science

Unit(s) Ecology - Air Pollution

Objective(s):

To observe harmful chemicals that may exist in the air which we breathe.

Procedure:

Stretch a piece of nylon stocking across a 35 mm slide frame. Staple the edges. Take the slide frame home and hang it outside in a place where the air can get at it but where it is protected from the sun and rain. Leave it there for a least a month. Then bring the slide frame back to school and place it in a slide projector.

How does the image projected on screen compare with the image of a new piece of nylon?

Stick a piece of the transparent tape that is sticky on both sides to a clean glass slide. Put the slide in a sheltered place as you did with the nylon. Bring it in after a week. Look at it closely. Use a low-power microscope.

Resources and Materials:

Piece of nylon stocking, 33mm slide frame, transparent tape (sticky on both sides) glass slide

Square of cotton cloth
Gallon can with plastic liner or gallon plastic jug
Slide projector
Microscope or magnifying glass

Evaluation:

The exposed piece will have broken threads resulting from acid-producing chemicals such as sulfur dioxide.

Comments on use:

About 10 minutes actual class time.

Joyce Schreck

Subject Area(s) Science

Unit(s) Ecology

What influences seed germination?

Objective(s):

You will investigate dormant and germinating seeds. You will make seeds germinate and test their responses to the environment. This investigation introduces the concept of behavioral responses by seeds and young plants to environmental factors. By pooling the data from their germination experiments, students should be able to infer the survival value of various responses of seeds to environmental conditions.

Procedure:

On the following pages are three experiments involving seed germination. It would be best to divide the class into small groups, assigning each group to an experiment, rather than requiring each student to do all experiments. Then, through class discussion and comparison of data, the students can share their experiment results with the class.

Resources and Materials:

Man and the Environment, Houghton Mifflin

Evaluation:

Comments on use:

These experiments do not require any equipment that couldn't be found in a science room. They can easily be done by 7th graders. The knowledge gained could be applied in further projects.

Joyce Schreck

Subject Area(s) Science

Unit(s) Ecology

Objective(s): What influences seed germination?

Procedure:

How do seeds respond to water? In this problem, you will investigate how water affects seeds. Does it affect the way seeds look? Can you look at a seed and tell when it is beginning to germinate? Does water affect the time it takes seeds to germinate?

Procedure:

A. Cut 4 pieces of filter paper or paper towel to fit in bottom of petri dish. Label top disk by dividing into three sections.
B. Take 10 untreated seeds and place in section 1.
C. Take 10 more untreated seeds and file a small groove in each seed. File just through seed coat on 1 flat side of each seed. Then put in section 2 with grooved side down.
D. Place 10 acid-treated seeds in section 3. (Teacher soaked seeds in concentrated sulfuric acid 20 minutes before class. Acid washed off with water and the seeds were dried.
E. Cover dish and place in small plastic bag to slow down evaporation.
F. Put dish on flat surface. Add more water when necessary.
G. Record the number of suds that germinate in each section each day.

Recording data--Need 2 tables: for length of seeds measured each day, for germination data. Daily record the number of seeds that germinate in each section of dish. Keep a record for 7 days.

Resources and Materials:

2 petri dishes
8 disks cut from paper towels or pieces of filter paper
40 untreated seeds
20 acid-treated seeds (same kind)
small plastic bag

Evaluation:

Look at data you got from measuring your seeds. Discuss this data with the class. Try to answer these questions.
Did any of the seeds change after they were kept in water for two days?
Did you observe any differences among the three groups of seeds?
If some groups changed more than others, was only water responsible?
What effect does acid or filing through seed costs have on germination?
What indifferences can you make to explain the data from the untreated seed group?
What hypothesis can you make about the way other kinds of seeds might reach to the same treatment?
What good is it for a seed to have a coat that resists letting water through?

126 Joyce Schreck

Subject Area(s) Science

Unit(s) Ecology

Objective(s):
How does temperature affect germination? Will seeds germinate faster or slower depending on the temperature? Do different seeds germinate better at different temperatures?

Procedure:

A. Place 4 disks in each petri dish. Label the top disk for each disk.
B. Add water to each dish.
C. Space 10 seeds of 1 kind over half of a dish. Add 10 seeds of another kind to the other half. Prepare all 3 dishes the same way.
D. Cover the dishes. Place each dish in its own plastic bag, to reduce evaporation.
E. Keep the seeds in a place where the temperatures will be nearly constant. 1 dish (50° F or 10° C) Must be kept in a refrigerator. 2 dish (75° F or 24° C) 3 dish (95° F or 35° C)
F. Check dishes daily for germination. Add more water if necessary.
G. Keep a record of data for 7 days. Remove seedlings if necessary.

Recording data--In a data table, record for each day the total number of germinated seeds in each half of each dish. Record any other observations.
Analyzing data--In what order did the groups of seeds begin to germinate? Did any kind of seed germinate at the same rate at all 3 temperatures? Could it be helpful for seeds to react to different temperatures? Did some seeds fail to germinate because water did not get inside? Does this experiment help you answer any of the questions from the beginning of this investigation?

Resources and Materials:

3 petri dishes
12 paper disks cut from paper towels or filter paper
2 kinds of seeds, 30 of each kind
3 small plastic bags

Evaluation:

Comments on use:

Joyce Schreck

Subject Area(s) Science

Unit(s) Ecology

Objective(s):

Do seeds respond to light and green plants can't live very long without eight. But what about seeds? Most seeds lose their green color as they ripen. Unlike parent plants, they don't contain chlorophyll. Do seeds need light to stay alive? Do they need certain light conditions to germinate?

Procedure:

A. Place 4 dishes in each dish with the labeled disk on top.
B. On half the dry paper, space 10 seeds of 1 kind. Add 10 seeds of another kind to the other half. Prepare both dishes the same.
C. Add water along the edge of the dish marked dark. Dishes should get wet but don't add too much so that the seeds float.
D. Within a minute after the water is added, seal the dish in black plastic sheeting.
E. Add water (same amount) to dish marked light. Seal it in a clear plastic bag within a minute after adding water.
F. Don't open dishes for 7 days. Record how many seeds germinate each day.

Recording data: Record how many seeds of each kind germinated in the light. Record how many seeds of each kind germinated in the dark. Also record other observations, especially any differences between the 2 containers.
Analyzing data--Did any kind of seed germinate better in darkness? In light? What was the purpose of not observing seeds in the dark until the last day of the experiment? Does your data tell you the best light conditions for germination? Do you think some seeds might need both light and dark? How could you test this? Were seedlings grown in the dark different from those in the light? You have no data to show when the seeds in the dark germinated. Can you think of a way to get this data?

Resources and Materials:

2 petri dishes
8 disks cut from paper towels or pieces of filter paper
2 kinds of seeds, 20 of each kind
black plastic sheeting
small plastic bag
tape scissors
eye dropper

Evaluation:

Comments on use:

Subject Area(s) Science

Unit(s) Ecology

Objective(s):
For the students to apply the knowledge gained in the experiment.

Procedure:

Have the students plan and prepare their own ecology plot. This could be a variety of things, depending on the facilities available. It could be preparing and planting a garden. The students should clear the area, work up the soil, and plant the area themselves. They should decide in advance what they want to plant. They should also take care of up keep. It may work best if divide the class in groups and hold each group responsible for an area.

Resources and Materials:

Hoes, rakes, clippers, etc., seeds, plants, small trees

Evaluation:

Comments on use:

This is practical application of knowledge. I tried this with my students and it worked very well. I was amazed at the number of students who had never actually done this type of work before.

Joyce Schreck

Subject Area(s) Science

Unit(s) Ecology

Objective(s):
To make the students aware of the effects of the environment on them.

Procedure:

Have a class discussion or have the class make up skits to illustrate this. Things to bring out are:
1. different clothes we wear at different times of year
2. different foods we eat
3. different recreational activities
4. certain occupations are seasonal
5. coats of pets change

It may also help to exaggerate the opposite illustrating what it would be like if we ignored our environment completely. The students could then make a bulletin board illustrating man in harmony with nature. A collage-type bulletin board with magazine pictures would be good.

Resources and Materials:

Evaluation:

Comments on use:

This is a good follow-up activity or it would be a good activity to have at the beginning of an ecology unit.

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Subject Area(s) Science

Unit(s) Ecology
Competing with Microbes

Objective(s):

Why does food rot? When decomposition occurs to objects we wish to keep, then it is considered undesirable. When it operates on waste products, we consider it desirable and promote the process. This experiment will give the students evidence that microorganisms are associated with rotting or decomposition.

Procedure:

Place a piece of hamburger about ½ inch square in each test tube. (Be sure to put the same amount of meat in each.)

Fill each test tube half full of water. Plug the tubes.

Place 1 tube in boiling water for 15 minutes.

Then remove the hot tube with a test tube holder.

Place both test tubes in the same test tube rack in a warm place.

Mark the boiled tube #1 and the other #2.

Observe the appearance of the meat and the liquid in each tube every day for three days. Look for such things as changes in color, texture, or odor. On the third day, remove the plugs to make final observations.

Resources and Materials:

fresh hamburger
2 test tubes with plugs
test tube holder and rack
pyrex beaker
bunsen burner
glass
marking pencils
microscope and slide
coverslip
medicine dropper or wire loop

Evaluation:

Does the data help answer these questions: Why does food rot? How could you apply what you have learned to food handling and preparation at home? In restaurants? As part of the summary, discuss possible sources of contamination of the meat. These sources include human handling at many stages, such as the slaughter house, the butcher, and the students themselves. Ground meat provides a greater surface area for bacterial contamination.

Comments on Use:

Subject Area(s) Science

Unit(s) Ecology
Competing with Microbes

Objective(s):

Do microbes cost you money? Students generally know that food is treated and packaged in a variety of ways, but few have developed the generalization that most of these processes are intended to reduce contamination and spoilage. This problem asks students to go into their community and gather data which will give them a specific, practical sense of microbial competition with man for food.

Procedure:

The people who manage the grocery store in your neighborhood are experts on food spoilage. The students will gather data from them on preserving food. About 4 students should gather data from each store. Pick a time when the store is not very busy. Interview the manager. If the store has a "meat man," a baker and a "vegetable man," talk to them too. Here are some questions you could ask.

Questions for Manager

1. Which foods can you keep the longest? Which foods have the shortest storage times?
2. What ways are there to keep goods from spoiling?
3. Is there any law that tells you how long you can keep food in the store and still sell it?
4. Do you ever have to send some foods back to the supplier? Why?
5. Do other kinds of food besides vegetables become usable if they are in the store too long?
6. Do you have any idea how much it costs the store each week to keep food from spoiling? Or how much food has to be thrown out?
7. When food spoils and is thrown out, how is this loss paid for?

Questions for Meat, Vegetable & Bakery Specialist

1. How long can you keep meat, vegetables, fruit or baked goods?
2. What kinds of items do you have to sell most rapidly?
3. What special way do you have to keep foods from spoiling?
4. Why is it difficult to keep meat, vegetables, or baked goods?

Resources and Materials:

Man and the Environment, Houghton Mifflin

Evaluation: Students should share their data with the rest of the class. (1) Why can some foods be stored longer than others? (2) What are several ways to prepare foods so they stay edible? (3) Does the cost of operating a store include losses from spoiled food? Who pays for this loss? (4) How does the local grocery store ensure that its customers get unspoiled food? Help students to focus on the consumer cost that results from microbial competition with man. The discussion could lead to a consideration of other serious issues such as the effect of food treatment on the taste or texture of foods, or the effects of food additives on health.

Comments on use: By rewording the questions, this exercise could also be carried out with restaurant managers.

Joyce Schreck

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Subject Area(s) Science

Unit(s) Ecology
Competing with Microbes

Objective(s):
What happens to garbage and trash? Students will learn that microbial decomposition is responsible for the destruction of natural organic wastes, but many materials currently produced by man do not decompose. This experiment should lead to discussion of possible solutions to the trash problem. Ask students, "Where does trash and garbage go?"

Procedure:

Have each student bring to school a piece of junk or garbage about 1 inch square. The class should test as many materials as possible. Include discarded food, several kinds of metals, glass, plastic, styrofoam packaging and aluminum cans. Place the materials on a layer of wet dirt. Carefully record the color, size and texture of each kind of material. Sketches or photographs of experiment. Cover the materials with an inch or so of damp soil and set the container in a warm place. Let it set for a week. Don't let the soil dry out. After one week, carefully remove the top layer of soil and record the condition of the materials.

Resources and Materials:

Junk and garbage
Moist soil
Shallow cardboard box lined with aluminum foil or plastic or plastic dishpan.

Evaluation: Which of your materials changed? What do you think caused the changes? Which of the materials did not seem to change? If the materials you tested are found in city trash, do you think that cities will be able to use dumps over and over? Can you make any suggestions to help prevent the world from being covered with junk? What can your family do to keep down the amount of junk to be buried down?

Comments on use: If the storage room has a low humidity, cover the boxes to keep the soil moist. Since some odor could come from decomposing organic waste, keep the size of pieces reasonably small. Two or three pieces of food waste per box should be sufficient.

Joyce Schreck

Subject Area(s) Science

Unit(s) Ecology

Organism versus organism

Objective(s):

Is your body the kind of environment that some microbes need? Your eyes and mouth are places where microbes can enter your body. Some can also live there. How does your body defend itself against microbes? Do you think tears or saliva might affect microbes? You can test the effect of tears or saliva on bacteria and molds. For example, you can mix tears with bacteria and observe the results.

Procedure:

Collect tears from a classmate. Have him hold a slice of onion near his nose. Then you can catch the tears in the small test tubes. Collect 7 or 8 tears in a test tube for each kind of bacteria you plan to test. Label each test tube with the name of the kind of bacteria you plan to use. Then add 1 ml (20 drops) of bacteria to each tube. Plug the tubes. Gently shake them to mix the bacteria and tears together. Then mix hot and cold water in a small jar to get a temperature between 110°-115°F. Put your tubes in the jar of water. Place the jar in an incubator at 110°-115°F (43°-46°C) for 15-20 minutes. Now observe the liquid in each tube. Does it look less cloudy? Is it thicker? If you don't see any change, leave the tubes in the incubator until tomorrow. If possible, check them several times before then.

Resources and Materials:

Piece of fresh onion
Several small sterile test tubes
Several kinds of bacteria
Medicine droppers
An incubator or heater that will keep a temperature of 110°-115°F (43°-46°C)

Evaluation:

Tears contain an antibiotic enzyme called lysozyme. This enzyme is capable of breaking open bacterial cells. When they break, the solution becomes clear or thick or both. A high concentration of lysozyme will usually cause a dramatic reaction within a half hour.

Comments on use:

If you want to work with saliva, use procedures similar to those described for tears. Rinse your mouth with water before collecting the saliva.

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Joyce Schreck

Subject Area(s) Science

Unit(s) Ecology

Who pollutes your environment?

Objective(s):

How do you affect your environment? Do you think about pollution when someone spreads weed killer on your lawn or when you run soapy bath water down the drain? This experiment will help you find out how you affect your environment.

Procedure:

Think about an experiment you would like to do to discover how common household products affect living things. Choose the organisms which you would like to study.

1. First select a product to test and an organism to test it on. Then find out about the normal behavior of your organism and how to care for it. Find out where it lives and the kind of food it eats if it is an animal.
2. When you have learned about the life of your plant or animal, write out a plan for your investigation. Decide on how much of the household product to use. The amount of that substance in a bottle of lake water would probably be very small.
3. Run your experiment. Observe your organism very carefully. Look out for pollution effects you did not plan to test for. If it looks like the chemical is seriously harming your plant or animal, stop the experiment at once. Place the organism in clean water.
4. Report your results to the rest of the class.

Resources and Materials:

To be determined by the individual depending on the experiment they decide to do.

Evaluation:

Did the product you tested cause pollution? You experimented with organisms alone in their containers. Think now about how changes in your organism might affect entire lakes, rivers, or harbors? Are there any ways that you can reduce pollution?

Comments on use:

Environmental change and its rate can be affected by individual action. Examples: pollution build-up can be reduced by using no more detergent than necessary when doing dishes, operating a washing machine only when having a full load, avoiding routine use of pesticides and herbicides. Sanding icy sidewalk is less harmful to the environment than salting it. Citizens should try to find out the long- and short-range biological effects of household products before using them.

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Joyce Schreck

Subject Area(s) Science

Unit(s) Ecology

Objective(s):

To get an idea of how fast the waste is piling up around us, try making a model of pollution.

Procedure:

Clear a space in the center of the room and put an ungreased pan on a hot plate. Pour in a cup of unpopped popcorn. Cover the pan and turn up the heat. Shake the covered pan every 15 seconds. After the first kernels pop, remove the cover. As the popping continues, try to pick up all the corn and throw it in the wastebasket. When the popping stops you stop. (One student performs as the class watches. Be sure to use fresh popcorn seeds. If the container has been left open, the seeds won't jump from the pan. Remember not to use any oil.)

The popped kernels represent the waste produced by man. The popped kernels you throw away stand for wastes that are removed from the air, land, and water by the environment. The popcorn left on the floor stands for waste that is piling up because the environment can't keep up with us.

Resources and Materials:

Popcorn
Frying pan and lid
Hot plate

Evaluation:

What happened? How long did it take the waste production (popcorn) to get ahead of the environment (the cleaner-upper)?
Was equilibrium reached?

Comments on use:

Takes about 20 minutes. Good activity to use as an illustration or introduction to a unit.

Joyce Schreck

Subject Area(s) Science

Unit(s) Ecology
Equilibrium

Objective(s):
To illustrate the concept of equilibrium. This game is an example of dynamic equilibrium.

Procedure:

Divide the class into 2 teams, 1/3 of students on 1 side and 2/3 on the other. A strip of tape across the center of the room marks off the playing territories. Each team must stay on its own side of the room at all times. The teacher dumps 800 plastic foam balls on the floor of the bigger team's half of the room. At the signal "go," the big team tries to throw as many balls as possible to the other side of the room in 2 seconds. The small team tries to send them back as fast as they come over the tape. At the end of 2 seconds, the small team counts the plastic foam balls in its half of the room. All 800 balls are then piled in the big team's half of the room for another round. Second round lasts for 5 seconds. The balls that end up in the small team's half of the room are counted again. The balls are gathered in the big team's half of the room for another round, this one lasting 10 seconds. Experiment could continue if desired. Data could be plotted on graph.

Resources and Materials:

800 plastic foam balls or styrofoam balls
(Experiment can be just as effective with less balls, depending on the number of students. I used 104 balls and it worked well for my class.)

Evaluation:

Even though the small team works as hard and fast as it can, the number of unreturned balls seems to increase as the throwing time gets longer. There are always 800 balls in circulation, however. Examples of equilibrium in nature should follow. Bring out how pollution and extinction upset this balance.

Comments on use:

Takes about 15 minutes. This activity can be a wild one. Supervise the class carefully setting up rules if necessary. Due to the noise factor, it would be difficult to do in any setting other than a self-contained classroom.

Joyce Schreck

Subject Area(s) Science

Unit(s) Ecology
Overpopulation

Objective(s):

To illustrate how the population has doubled. Also shows the students' positions in the increasing population and how they themselves affect population growth.

Procedure:

Gather information from parents and grandparents about your family tree. Have each student draw their family tree from their great-grandparents (or as far back as they wish). Make a simple chart using stick men. (The object here is to illustrate numbers of people.) Have the students share their family trees. Add up the number of people added to the world in each generation just with the class.

Resources and Materials:

Evaluation:

Comments on use:

Good activity for junior high age. Could be extended for other purposes such as heritage if desired.

Joyce Schreck

Subject Area(s) Science

Unit(s) Ecology
Overpopulation - food shortage

Objective(s):

The following class exercise is designed to illustrate the effect of overpopulation on the food supply and land space.

Procedure:

(To be done during the noon hour on consecutive days. Length will depend on number of students involved.)

First day have 2 students eat in closet with 2 lunches.

Second day double the amount of people but keep the quantity of food the same with only 2 lunches.

Third day double the number of people eating in the closet again but keep the amount of food the same.

Continue until all the students are in the closet.

Discussion should follow. Such topics as our food waste, ways to eliminate food shortages, and crowded conditions should be discussed.

Resources and Materials:

A small room or walk-in closet
Students' lunches

Evaluation:

Can be an effective illustration of over-crowdedness and food shortages. Students get a chance to feel hunger.

Comments on use:

In our affluent society, it is hard to get across to the students' hunger and shortage of food. Can carry it farther by comparing our food waste to the amount some people have to eat.

Joyce Schreck

Subject Area(s) Science

Unit(s) Ecology
Water pollution

Objective(s):

This experiment can be used to illustrate water pollution.

Procedure:

Put a drop each of rain water, stream or pond water, drinking water, and distilled water on a clean piece of glass. (Do not use cleaners to polish the glass.) Label each drop with a marker. Let each of the samples evaporate in the sunlight. Examine the spot where each drop of water used to be. How much of the staff left on the slide is harmful to people and animals? Which water sample left the most stuff?
Should rainwater leave anything at all? Write a letter to your local health department asking if they have checked out the water in your area.

Resources and Materials:

Piece of glass or 4 glass slides
Eye droppers

Evaluation:

Comments on use:

Joyce Schreck

Subject Area(s) Science

Unit(s) Ecology

Objective(s):

How Does Light Affect Euglenas?

Each living thing is affected by everything around it. Ecology is the study of how the environment affects living things and how they affect their environment. This investigation is designed to illustrate how the environment affects animal behavior. Students should predict some of the characteristics these animals need to survive.

Procedure:

The students first must understand the process of photosynthesis. They also must understand what chlorophyll is and its role in the photosynthesis process.

Have the students observe euglenas under a microscope, so they know what the organisms look like and they can see the cholorophyll in their bodies.

Experiment--How do euglenas react to light and dark?

Take a piece of balck paper large enough to wrap around the vial. Make a hole in it with paper punch. Tape paper so it fits snugly around vial. Cut another piece to form a cap. Light should come through cap only. Take cover off so students can note where euglenas are before experiment begins. Slide paper cover on. Then put the vial where it will get bright light for 2 or 3 hours before next class period (but not direct light). Next class meeting remove paper cover without stirring up liquid. Note where euglenas are. Record data and discuss light reactions of euglenas. Emphasize the affect that the environment has on euglenas relating this to you. How does light affect your life?

Resources and Materials:

Teacher should grow a population of euglenas for this lesson. They will live in a thin "pea soup" made from water and ordinary split peas. Microscope, slides vial of euglenas

Container of euglenas filled almost to top

Black construction paper

Evaluation:

Comments on use:

Discussion could also be extended to include the students' environments. What has as important of an effect on their life as light does for the euglena? Emphasis could be placed on the importance of light in our lives.

Joyce Schreck

Subject Area(s) Science

Unit(s) Ecology

Objective(s):

To introduce the students to bhe basic concepts of ecology.

Procedure:	Resources and Materials:
Define and discuss the meanings of basic terms: ecology, biological community, ecosystem, food chain, food web, prey, predator, biome.	Could use transparencies to better explain these terms.
Have the students make up food chains which man is included. Show how these different food chains form a food web emphasizing man's role in biological community.	Could show the film "Nature's Half-Acre," by Disney "The Changing Forest" by McGraw, or "Way of Life" by Mo. Conservation
In discussing biological community, could relate to the "community" which exists in their own back yard or at a pond.	
Make posters illustrating food webs. Could make a food web of a particular biome. Cut out magazine pictures of animals and paste on paper, including negetation also.	National Wildlife, International Wildlife, Audobon Society, Conservationist would be good magazines to use

Evaluation:

The understanding and mastering of the basic ecological terms is necessary in the study of ecology.

Comments on use:

This will take several class periods, in order for the students to fully understand these basic concepts.

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Joyce Schreck

Subject Area(s) Science

Unit(s) Plants

Objective(s):
To make student aware of natural things around him. To help student develop his own creativity. To expose him to possible leisure time activity.

Procedure:	Resources and Materials:
Introduce topic and purpose	
Show film. Have a person from florist shop come to class or visit a florist shop etc. to make student aware of sources, techniques, etc.	Film on flower arranging Tour to Kim Originals, etc. to see arrangements being made Speaker from florist shop come to class
Students gather weeds, flowers, seed cones, etc.	
Dry flowers	
Make arrangements	

Evaluation:
Students will be aware of procedure involved in arrangement creation.

Comments on use:
Can be used not only for career exploration but also for ecological emphasis using natural things around us.

Joyce Schreck

Subject Area(s) Science

Unit(s) Drugs

Objective(s):
To expose student to pharmacology. To make student aware of hazards involved in use of drugs. Exposing student to procedure involved in drug control.

Procedure:	Resources and Materials:
Class study different types of drugs, uses and abuses, effects on body, etc.	Local pharmacist Local physician
Have physician or pharmacist visit and talk with class or have students visit a local pharmacy. (Student will also have opportunity to observe the job of pharmacist.)	
Have policeman visit or visit local police station Not only have police officer discuss hazards of drugs but also ask him to include the role and duties of a police officer working on drug control.	Member of police force

Evaluation:
Students will learn hazards of drugs.
Students will become aware of the physical hazards and the social hazards of using drugs.

Comments on use:

Subject Area(s) Science

Unit(s) Biochemiatry - Insecticides & Herbicides

Objective(s):

Students will be aware of some of the great strides made in the field of pest control and the dangers of their use. Students will be aware of biological control methods. Students will observe selectivity of herbicides and their residual effects. Students will see various control methods through eyes of the manufacturer.

Procedure:

Students will read about Biochemistry in a textbook.

Students will hear a guest speaker who knows about chemicals for controlling crop enemies and household pests.

Students will hear from a visiting environmentalist about natural methods of pest control.

Students will experiment with effects on "weeds" of herbicides.

Students will view film about pesticides and herbicides.

Resources and Materials:

Physical Science: A Search for Understanding. Brown & Anderson Lippincott pp. 218-20.

(a) Agricultural chemicals salesman
(b) County agent
(c) Exterminator

(a) biologist
(b) ecologist
(c) college professor

2, 4, D
Amiben
Treflan
Atrazine, etc.

(a) Chemagro Corp.
7000 Roberts, K.C., MO
(b) Shell Oil Co.

Evaluation:

Class and individual activities

Comments on use:

Edgar A. Phillips

Subject Area(s) Science

Unit(s) Biochemistry - Fertilizers

Objective(s):
Students will know why fertilizers are used and their make up. Students will get an idea of soil need and will get experience in doing work of a soil technician and view the effects of soil deficiencies and over compensation.

Procedure:

Students will read about chemical fertilizers.

Students will see various fertilizers.

Students will run simple soil tests for nitrogen, phosphorus, potassium, magnesium, and organic matter.

Students will be visited by a person knowledgable in soils and or plant chemistry.

Students will do a series of experiments with plants grown in soils deficient in various elements.

Students will do experiments using too much fertilizer and will catch runoff water and do experiments with it.

Resources and Materials:

Physical Science: A Search for Understanding. Brown & Anderson Lippincott pp. 219-220

Local garden store

Soil test kits from science or agricultural lab. supplier.

(a) County ag. agent
(b) Lawn and garden dealer
(c) Ag. chemist
(d) Soil conservation specialist

Corn, beans, peas, farm or store.

Ecology or biology textbooks or lab. manuals.

Evaluation:

Class and individual projects

Comments on use:

Edgar A. Phillips

Subject Area(s) Science

Unit(s) Biochemistry - Plastics & Synthetic Fabric

Objective(s):
Students will understand that artificial fabrics derived from organic compounds. Students will be able to list three raw materials used in making synthetics and will make an organic plastic. Students will be able to list 4 jobs in plastics. Students will know the uses, advantages, disadvantages, and limitations of various kinds of synthetics.

Procedure:
Students will view a film about plastics.

Students will read about and answer questions about plastics.

Students will make a plastic in the laboratory.

Students will visit a plastics manufacturing plant.

The class will be visited by an organic chemist.

Students will bring to class and classify and identify common plastics.

Resources and Materials:
EPS Free Film Catalog

Physical Science: A Search for Understanding
Brown & Anderson
Lippincott pp 248-52

Baby food jars, tin cans, formalin, analine hydrochloride.

Local plastics plant.

(a) Local college prof.
(b) Chemist from a petrochemical plant.

Samples from home, etc.

Evaluation:

Class and individual projects.

Comments on use:

Subject Area(s) Science

Unit(s) Biochemistry - Pollution

Objective(s):

Students will receive a broad overview of the pollution problem from a balanced point of view and develop an awareness of the problems. Students will be aware of at least three job possibilities in pollution control.

Procedure:	Resources and Materials:
Students will do some reading on the pollution problems.	(a) Physical Science; Challenges to Science. Williams, Bolen, Doerhoff McGraw-Hill, pp. 257-69 (b) Science in Modern Life Mallinson. Ginn. & Co. pp. 515-69
Students will report on cases of pollution that they can find in their own area.	(a) Local streams (b) Local industries (c) Their own back yards, etc.
Students will form a project to clean up an area of pollution.	Trash filled lot, stream, park, etc.
Students will experiment with burning fuels, the major source of air pollution.	Candle, kerosene, or diesel fuel and a cold dish, limewater and palladium sulfate.
Students will test water samples for various pollutants.	Water Pollution Test Kit
Class will be visited by a pollution control engineer or other informed person.	(a) Local pollution engineer. (b) College student majoring in pollution control.
Students will take a field trip to a business or industry with a pollution awareness.	A local manufacturer employing pollution control methods.
Students will view film of pollution.	The Poisened Planet by McGraw-Hill films. 1221 Ave. of Americans New York, N.Y. 10020

Evaluation:

Class and individual projects.

Comments on use:

Edgar A. Phillips

Subject Area(s) Science

Unit(s) Chemistry - Atomic Molecular Theory

Objective(s):

Students will know that a study of chemistry can include all material things. Students will have some idea of the difference between the jobs of lab. technician and the chemist and the prerequisites of each. Students will create spontaneous change of chemical energy to electrical energy and see inorganic chemistry at work.

Procedure:	Resources and Materials:
Students will study the Basic Chemistry section of their textbook.	Physical Science: A Search for Understanding Brown and Anderson Lipplincott. pp. 150-80
Students will experiment with oxygen.	Potassium chlorate, ordinary laboratory glass ware, candles, splints, steel wool.
Students will be visited by a chemist.	(a) Local chemist (b) Pharmacist
Students will make a field trip to some kind of laboratory.	(a) Quality control lab. of a local manufacturer. (b) Hospital laboratory. (c) College research lab.
Students will examine as many samples of pure elements as possible.	(a) Scientific supply houses. (b) Local sources
Students will split the water molecule and chemically recombine it, by using electrolysis and combustion.	Electrolysis kit and batteries from a school supplier.
Students will make a battery.	Voltmeter, various kinds of metal strips and electrolytes.
Students will take a field trip to a business where electroplating is done.	(a) Local rechrome shop (b) Jeweler who does silver, gold, and copper plating.

Evaluation:

Class and individual projects

Comments on use:

Edgar A. Phillips

Subject Area(s) Science

Unit(s) Chemistry - Analysis

Objective(s):

Students will see a practical use of chemistry. Students will have some idea of the tools and work of an analytical chemist. Students will learn about 4 job opportunities in analytical work.

Procedure:

Students will read about the chemist as a detective in their textbook or other reference.

The class will visit the crime laboratory of a law enforcement agency.

Students will visit an analytical laboratory.

Experiments will be done by students used to analyze.

Class will be visited by an analytical chemist.

Resources and Materials:

Physical Science: A Search for Understanding. Anderson & Brown Lippincott pp. 203-212

Local crime lab.

(a) quality control lab.
(b) water purity lab.
(c) soil analysis lab.
(d) local college analytical laboratory.

Introductory Physical Science
Haber-Schaim et. al.
Prentice-Hall pp. 77-96

(b) Common laboratory equipment and supplies. (much of which can be had at low cost and some can be improvised)

Local chemist or technician involved in analytical work.

Evaluation:

Class and individual activities

Comments on use:

Subject Area(s) Science

Unit(s) Magnetism

Objective(s):
Students will understand the properties of magnetism and its practical application.
Students will learn the principles of electromagnetism and magnetic fields.

Procedure:

Students will use text to find out about magnetism.

Students will experiment with magnets.

Students will make a model (working) electric motor.

Students will map magnetic lines of force with a small compass and a magnet.

Students will be using a large compass, and by striking a piece of soft iron held parallel to the earth's magnetic field will consider the earth as a magnet.

Resources and Materials:

Science in Modern Life
Mallinson Ginn & Co.
pp. 401-413

Magnets, coils of wire, galvanometer, various liquids and solids to determine attractability

Nails, insulated wire, iron wire, boards, batteries.

Small compasses and magnets.

(a) Large compass, soft iron bar, hammer.
(b) Charts of van Allen belts

Evaluation:

Class and individual projects

Comments on use:

Subject Area(s) Science

Unit(s) Electricity

Objective(s):

Students will get an overview of the basics of electricity and its practical uses. Students will learn about skills involved in wiring installation. Students will understand difference between technical and design aspects of electrical applications. Students will see the application of electricity to machines that are common in their homes.

Procedure:

Class will have a section of study using book as a guide.

Students will be visited by a local electrician.

Students will be visited by an electrical engineer.

Students will take a field trip to power plant if permissable.

Students will visit a house or business under construction with "rough in" wiring already done.

Students may visit an appliance repair shop or repairman will visit the class.

Students will build a working model of an electric motor.

Resources and Materials:

Physical Science: A Search for Understanding. Brown & Anderson Lippincott pp. 277-316

Science in Modern Life
Mallinson. Ginn & Co.
pp. 414-437

Local electrician.

Local engineer of college engineering professor.

Field trips:
(a) City power plant
(b) Hydroelectric damsite power house.

Local new home under construction.

Local shop

Nails, insulated wire, glass tubing, batteries.

Evaluation:

Class and individual projects

Comments on use:

Subject Area(s) Science

Unit(s) Sound

Objective(s):

Students will be aware of the various aspects of sound including speed, interfence in waves reflection, and absorption. The student will be aware of the meanings of the terms: quality, pitch, and overtones. Student will have his attention directed to careers in music other than musician. Students will know basic structure of ear and larynx.

Procedure:

Students will read about sound in the reference materials.

A piano tuner or musician will visit the class.

Students will experiment to find the speed of sound in air.

Students will visit auditorium or recording studio acoustically designed.

Students will be visited by a physician.

Resources and Materials:

Physical Science
Brown & Anderson, Lippincott
pp. 402-424

Science in Modern Life
Mallinson. Ginn pp. 444-455

(a) Local piano tuner
(b) Local instrument repairman
(c) Local musician
(d) Music teacher
(e) Gifted class member

(a) Large diameter tube, tuning forks, water pails

(a) School auditorium or
(b) Local recording studio

Local eye, ear, nose and throat specialist

Evaluation:

Class and individual projects

Comments on use:

Subject Area(s) Science

Unit(s) Electricity-Electronic Computers

Objective(s):

Students will get an overview of computer technology including working with circuits.
Students will get first hand information in careers in computers.

Procedure:

Students will do some reading research on electronic computers.

Students will review binary numbers.

Students will compose a letter to a large computer manufacturer asking for information on computers and careers in computer technology.

Students will build some simple computer like circuits.

Students will be visited by a teacher with special training in computers or by a computer programmer.

Students will take a fieldtrip to see a computer in operation.

Resources and Materials:

Physical Science Challenges to Science Williams, et. al. McGraw-Hill pp. 341-352

Any recent Math text
Physical Science
Williams, et. al.
McGraw-Hill pp. 345-6

IBM Corp.

Switches from Allied Radio Shack or Lafayette.
Wire and batteries locally or from Cenco or other school supplier.

Local math teacher
Computer repair man
Computer programmer

Local business or agency with a sophisticated computer.

Evaluation:

Class and individual projects

Comments on use:

Subject Area(s) Science

Unit(s) Electronics-Radio and Television

Objective(s):

Students will get an overview of the subject of radio and television and may form ideas for a career in film, electronics technician, broadcasting, etc. Students will be aware of the use of electromagnetic waves in carrying messages. Students will build a working model.

Procedure:

Students will study radio and television and electromagnetic waves in various references.

Students will see a film about modern communications.

Students will build a diode radio set.

Students will visit a radio-television station.

Class will be visited by a guest technician.

Resources and Materials:

Encylopedias
Physical Science: A Search for Understanding.
Brown & Anderson, Lippincott
pp. 319-36

Science in Modern Life
Mallinson, Ginn & Co.
pp. 459-471

EPS Free Film catalog

1N34 transistors, ear plugs, insulated 27 ga. wire, variable condensor from old radio. Kits from supplier

Local radio-TV station

Local TV repairman
Vo. tech instructor

Evaluation:

Class and individual projects

Comments on use:

Edgar A. Phillips

GUEST SPEAKER AND FIELD TRIP SITE LISTING

NAME	ADDRESS	CONTACT REPRESENTATIVE	TELEPHONE	FIELD TRIP	GROUP SIZE	GRADE LEVEL	GUEST SPEAKER
Adco	900 W. Main Sedalia, MO	Dr. Alexander	826-3300	Yes	1-6	9-12	No
Allstate Insurance Co.	4800 E. 63rd Kansas City, MO	Mr. John Irish	333-6800	Yes	20	11-16	No
American Electrical Industries	Highway 50 Sedalia, MO	Mr. Russ Woodyard	827-1712	Yes	30	6-12	Yes
Archias Floral Co.	4th & Park Sedalia, MO	Mr. Don King	826-4000	Yes	20	K-12	Yes
Artist	203 N. Jefferson Sedalia, MO	Ms. Thelma Hansen	886-8464	No	0	7-12	Yes
Attorney at Law	Cole Camp, MO	Mr. Pete Stelling	668-4858	No	0	0	Yes
Attorney at Law	Warsaw, MO	Mr. Edwin F. Brady	438-5116	Yes	4-5	9-12	Yes
Attorney at Law	Farmer's Savings Bank Marshall, MO	Mr. Larry McClure	886-6986	No	0	7-12	Yes
Ault's Skelly Station	1570 S. Kentucky Marshall, MO	Mr. Bob Ault	886-6792	No	0	7-12	No
B & E Market	1701 S. Kentucky Marshall, MO	Mr. Jim Dick	886-2188	Yes	30	3-12	No
Banges	78 S. Jefferson Marshall, MO	Ms. Dolly Kiser	886-3716	No	0	7-12	Yes
Banquet Foods	253 W. Marion St. Marshall, MO	Mr. Caton Martin	886-3301	Yes	20	4-9	Possibly
Benton County Enterprise	Warsaw, MO	Mr. Mahlon White	438-6312	Yes	4-5	9-12	Possibly
Benton County R-I School	Cole Camp, MO	Mr. Vergil Oglevie	668-4427	No	0	0	Possibly

NAME	ADDRESS	CONTACT REPRESENTATIVE	TELEPHONE	FIELD TRIP	GROUP SIZE	GRADE LEVEL	GUEST SPEAKER
Benton County R-IX	Warsaw, MO	Dr. John Boise	438-7351	No	0	8-10	Yes
Benton County Sheriff's Dept.	Warsaw, MO	Mr. Robert Breshears	438-5252	Yes	5-6	9-10	Yes
Binghams Super Saver	La Monte, MO	Mrs. Bingham	347-5426	No	0	0	No
Body Shop	Cole Camp, MO	Mr. David Luetjen	668-3155	Yes	2-4	9-10	No
Bohling Grocery	Cole Camp, MO	Mr. E. G. Bohling		No	0	0	Possibly
Boonslick Regional Library	Sixth & Lamine Sedalia, MO	Ms. V. Corley	826-6195	Yes	20	K-9	Possibly
Borchers & Heimsoth	Cole Camp, MO	Mr. Ervin Borchers	668-4923	No	0	0	No
Bothwell Hospital Physical Therapy	Sedalia, MO	Ms. Nevin Almquist	826-8833	Yes	7-15	7-12	Yes
Bothwell Hospital	Sedalia, MO	Ms. Marie Nicholson	826-8833	Yes	20	12-16	No
Breech Academy - TWA	6300 Lamar Avenue Mission, KS	Ms. Mickey Holiday	842-4000	Yes	20	11-16	Yes
Brick Mason	RFD 3 Warsaw, MO	Mr. Lee Slavens	438-5360	No	0	0	Possibly
Broadway Car Wash	310 W. Broadway Sedalia, MO	Mr. Dale Arms	826-0375	Yes	25-30	1-12	No
Broadway Lanes, Inc.	2119 W. Broadway Sedalia, MO	Ms. Edith Simons	827-0404	Yes	Large	K-14	Possibly
Brown, McCloskey, Buckley	309 E. 5th St. Sedalia, MO	Ms. Mabel Glenn	826-7373	No	0	0	No
Business Mens Assurance	BMS Building Kansas City, MO	Ms. Almeta Wilcher	753-8000	Yes	20	11-16	No

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C-B Shop	Cole Camp, MO	Mr. Dave Wordeman		Yes	4	9-12	No
C. W. Flower	219 S. Ohio Sedalia, MO	Mrs. Austin	826-3200	Yes	15-20	11-16	Yes
Cablevision, Inc.	600 S. Osage Sedalia, MO	Mr. Lynn Harrison	826-0933	Yes	20	5-9	Possibly
Cargill Incorporated	Marshall, MO	Mr. Jack Hartwick	886-7473	Yes	20-25	9	Possibly
Cargill Nutrena Feeds	Smithton, MO	Mr. Gene Hudiburg	343-5319	Yes	10	7-12	Yes
Cash U. S. Super	Cole Camp, MO	Mr. Jim Cash	668-3700	Possibly	0	0	No
City Offices	214 N. Lafayette Marshall, MO	Mr. Ron Collins	886-2226	No	0	7-12	Yes
Classic Studio	6th & Kentucky Sedalia, MO	Mr. Ed Brummett	826-8888	Yes	5-10	7-12	Yes
Clay Mead Furniture	Highway 65 Marshall, MO	Ms. Kay Perkins	886-5354	No	0	7-12	Yes
Coffman's Marina	Highway 65 South Sedalia, MO	Mr. John Smith	827-3692	Yes	1-6	9-12	No
Commerce Bank	10th & Walnut Kansas City, MO	Mr. John Wells	234-2000	Yes	20	11-16	No
Consumers Supermarket	Hancock & Broadway Sedalia, MO	Mr. Bill Smillie	827-3190	Yes	15	K-12	Yes
Courts Lawn and Garden	Marshall, MO	Mr. Delford Thompson	886-5000	No	0	7-12	Yes
Creasy's Insurance Agency	Warsaw, MO	Mr. Gordon Creasy	438-5621	No	0	0	Yes
Dala's Boutique	Tipton, MO	Ms. Dala Yantz	433-2626	No	0	0	Yes
Day Care	321 W. Second Sedalia, MO	Mrs. Zimmerschied	826-5040	Yes	1 a day	0	Yes

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DeKalb Ag. Research	Marshall, MO	Mr. Don Wert	886-7438	Yes	10-40	5-9	Possibly
DeLong Dry Goods	Warsaw, MO	Mrs. DeLong	438-5307	No	0	0	Possibly
Deluxe Cafe	Cole Camp, MO	Ms. Marie Musser	668-4521	Yes	2-4	9-10	Yes
Democrat News	Marshall, MO	Mr. Jerry Arnett	886-2233	Yes	25	7-9	Yes
Dentist	Warsaw, MO	Dr. Shepardson	438-5421	No	0	0	Possibly
Dentist	1810 W. 11th Sedalia, MO	Dr Robert Vit	826-5445	No	0	K-12	No
Dentist	Cole Camp, MO	Dr. D. V. Reimsnitter	668-3312	Yes	4-6	9-12	Possibly
Doctor of Osteopathy	1701 S. Lafayette Sedalia, MO	Dr. Joe Bennett	826-6633	Yes	5 at a time, 40 maximum	7-12	Yes
Don's Dive Shop	3312 S. Highway 65 Sedalia, MO	Mr. Don Kabler	826-4681	No	0	8-12	Yes
Don's Welding	Highway 65 South Sedalia, MO	Mr. Don Carr	826-7310	Yes	1-10	8-12	No
Duke Manufacturing	Main & Duke Road Sedalia, MO	Mr. Ivan Stuart	827-2661	Yes	10	4-12	No
Durham Chevrolet	Warsaw, MO	Mr. Floyd Durham	438-5133	Yes	10	8-12	Yes
Eckhoff Clothing	Cole Camp, MO	Mr. Raymond Eckhoff	668-4707	Yes	4	9-12	No
Essers	18 S. Jefferson Marshall, MO	Mr. David Esser	886-2107	No	0	7-12	Yes
Estes' 66 Station	Warsaw, MO	Mr. Gary Estes	438-6022	No	0	0	Possibly
Farmer's Bank of Lincoln	Lincoln, MO	Mr. Karl Kroenke	547-3311	Yes	4-5	9-12	Possibly
Farmer's Insurance	1806 W. 11th Sedalia, MO	Mr. Newby	827-0122	Yes	1-5	9-12	Possibly

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Fire Station	211 S. Kentucky Sedalia, MO	Mr. Jabas	826-8044	Yes	1-15	0	Possibly
Flat Creek Vet. Hosp.	1701 W. Main Sedalia, MO	Dr. Peacock	827-2057	Yes	10-15	K-12	Yes
Gambles	2 S. Jefferson Marshall, MO	Mr. Norvelle Brown	886-6823	No	0	7-12	Yes
Bill Greer Body Shop	Main Street Sedalia, MO	Mr. Orval Burd	827-2162	Yes	5	10-12	No
Hallmark	25th & McGee Kansas City, MO	Ms. Rose A. Lightle	274-4667	Yes	20	11-16	Yes
Harris & Reid	Farmer's Savings Bank Marshall, MO	Mr. Mike Reid	886-5544	No	0	7-12	Yes
Heinzler Bros. Welding	Marshall, MO	Mr. Frank Heinzler	886-7775	Yes	20-25	7-9	No
Holiday Inn	32nd & Limit Sedalia, MO	Mr. Jim Grieshaber	826-6100	Yes	40-50	8-9	Possibly
Home Lumber	207 E. North Marshall, MO	Mr. Roland Wood	886-3342	No	0	7-12	Yes
Horse Racing	P.O. Box 951 Sedalia, MO	Mr. Anderson	826-7114	Yes	1-10	9-12	Possibly
Howard Construction	1509 N. Ohio Sedalia, MO	Mr. Olen Howard	826-5750	Yes	5-15	8-12	No
Hurtt's Pharmacy	504 W. 16th Sedalia, MO	Mr. Hurtt	826-2872	Yes	1-10	8-12	Possibly
IBEW Local 814 Credit Union	2111 W. Broadway Sedalia, MO	Ms. June Kuhlman	826-0814	Yes	6 at a time	8-12	Possibly
IGA	2402 W. Broadway Sedalia, MO	Mr. Ralph Huff	827-1452	Yes	25	K-12	Yes

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Industrial Loan & Investment	120 W. Fifth Sedalia, MO	Mr. Firman Boul	826-4800	Yes	25	7-12	Yes
J & J's	1421 S. Limit Sedalia, MO	Mr. Jack Smith	827-2485	No	0	0	Possibly
Jack Couts' Running Quarter Horses	Mo. State Fair Grounds Sedalia, MO	Ms. Tina Brown	826-1135	Yes	5-10	K-12	No
Jim's Garden Center	1000 W. Main Sedalia, MO	Mr. James L. Foster	826-4411	Yes	15	4-9	Possibly
Bob Johnson TV & Appliance	2907 W. Broadway Sedalia, MO	Mr. Ray Thompson Mr. Paul Johnson	827-2326	Yes	15-20	7-12	Yes
KDRO Radio	West Highway 50 Sedalia, MO	Mr. Herb Brandes	826-5005	Yes	15	K-12	Possibly
Keeharts	Marshall, MO	Ms. Alice Alexander	886-5611	No	0	7-12	Yes
Kim Originals	2500 E. Broadway Sedalia, MO	Mr. Bill Cline	826-2500	Yes	15	K-12	Possibly
Kings Court	Marshall, MO	Mr. Bill Coman	886-5444	Yes	15	7-12	No
KMMO-KMFL	Highway 65 North Marshall, MO	Mr. Harold Douglas Mr. Jim Athon Mr. Jack Abdon	886-7422	No	0	7-12	Yes
KMOS TV Station	2100 W. Broadway Sedalia, MO	Mr. Stuart Gressley	826-1651	Yes	15	K-12	Yes
KSIS Radio	North 65 Highway Sedalia, MO	Mr. Carl Yates	826-1050	Yes	10	K-14	Yes
Lacuma Builders, Inc.	2800 W. Main Sedalia, MO	Mr. Bob Cook	826-0522	No	0	0	Yes

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Lamm, Barnett, Crawford, Barnes, Fritz Law Firm	118 W. Fifth Sedalia, MO	Mr. Donald Barnes	826-5428	No	0	11-12	Yes
Lee's Archery Manufacturing	Route 2 Sedalia, MO	Mr. LeRoy Young	826-6762	Yes	20	7-16	No
Lee's Studio	20 S. Jefferson Marshall, MO	Mr. Lee Beardon	886-7313	No	0	7-12	Yes
Lifeguard	2401 W. Second Sedalia, MO	Ms. Diane Cordry	826-7719	No	1-15	8-10	Yes
Lincoln New Era Newspaper	Lincoln, MO	Mr. George Williams	547-3800	Yes	Inquire	Inquire	Possibly
Locker Plant	Hughesville, MO	Mr. Bill Wheeler	826-8630	Yes	10-15	1-12	Yes
Macy's	1034 Main Kansas City, MO	Mrs. Cullen	221-3737	Yes	20	11-16	No
Magistrate Judge--Pettis County	901 S. Vermont Sedalia, MO	Ms. Hazel Palmer	826-8816	No	0	11-12	Yes
Marshall Chamber of Commerce	214 N. Lafayette Marshall, MO	Mr. Leo Hayob	886-7464	No	0	7-12	Yes
Marshall Floral & Greenhouse	160 W. Summit Marshall, MO	Ms. Juanita Dametz	886-7177	Yes	20	7-9	Yes
Marshall Police	Arrow Street Marshall, MO	Mr. Gerald Stone	886-7411	Yes	15-20	1-12	Yes
Marshall Public Schools	565 S. Odell Marshall, MO	Dr. John Payne	886-2244	Yes	20-30	7-12	Yes
Martin Lumber	Hughesville, MO	Mr. Con Scott	826-7556	No	0	0	No
Mattingly's Variety Store	218 S. Ohio Sedalia, MO	Mr. Bill Stratton	826-5270	Yes	20	7-12	Possibly

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Merle Norman Cosmetics	120 S. Ohio Sedalia, MO	Ms. Sandra Boul	826-6430	No	0	11-16	Yes
MFA Elevator	Cole Camp, MO	Mr. Ed Schnakenberg	668-3231	Yes	6-8	9-10	Possibly
MFA Grocery	Lincoln, MO	Mr. Joe McKnight	547-3621	No	0	0	Yes
MFA Implement	Lincoln, MO	Mr. Clarence Frisch	547-3318	Yes	4	9-12	No
MFA Insurance	1817 W. Broadway Columbia, MO	Mr. Vic Ohman	445-8441	Yes	20	11-16	No
Missouri Division of E. S.	215 E. Fifth Sedalia, MO	Mr. Bill Giles	826-8184	Yes	25	11-12	Yes
Missouri Pacific Railroad	210 N. 13th St. St. Louis, MO	Mr. D. M. Tutke	314-2944	Yes	Arr.	7-12	Possibly
Missouri State Bank	917 S. Limit Sedalia, MO	Mr. William Claycomb	826-1213	Yes	20-25	4-12	Possibly
Missouri State Fair	Box 111 Sedalia, MO	Ms. Myrna Ragar	826-0570	Yes	30	3-7	Possibly
Missouri Valley College	Marshall, MO	Mr. Ed Leslie	886-6924	No	0	9-12	Yes
Model Cleaners	Warsaw, MO	Mr. Richard Kingma	438-5831	Yes	20	K-12	No
Ollison's Garage	2809 E. 12th Sedalia, MO	Mr. Keith Ollison	826-4077	No	0	0	Yes
Otten Truckline	Cole Camp, MO	Mr. Pete Otten	668-3112	No	0	0	Yes
Patricia Stephens Modeling Finishing School	4638 Nichols Parkway Kansas City, MO	Ms. Sue Peterson	531-5866	Yes	60	7-12	Yes
Pepsi-Cola Bottling Co.	Sedalia, MO	Mr. W. C. Rean	[illegible]	Yes	30	[illegible]	Possibly

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Pettis County Ambulance	626 E. Fifth Sedalia, MO	Mr. Joe Wasson	826-5316	Yes	10-15	6-12	Possibly
Phyllis's Beauty Shop	Cole Camp, MO	Ms. Phyllis Templeton	668-3750	Yes	6	9-12	No
Pittsburgh Corning	16th & Missouri Pacific Spur Sedalia, MO	Ms. Rita Kenney	826-4660	No	0	0	No
Post Office	205 N. Lafayette Marshall, MO	Mr. Weislocker	886-6200	Yes	25	7-9	No
Post Office	405 E. Fifth Sedalia, MO	Mr. Roy Hinton	826-8887	Yes	25-30	4-9	Possibly
Quality Body Shop	501 N. Park Sedalia, MO	Mr. Bill Utz	826-2126	Yes	1-10	8-12	No
Rainbow Radio & TV	Lincoln, MO	Mr. Rainbow	547-3317	Yes	4	9-12	No
Ramada Inn	3501 W. Broadway Sedalia, MO	Mr. Darrell Olsen	826-8400	Yes	15	5-12	Possibly
Reinhart Fajen, Inc.	Warsaw, MO	Ms. Eloise Atkins	438-5111	Yes	8-10	9-12	Possibly
Rest Haven Retirement Home	1800 S. Ingram Sedalia, MO		827-0845	Yes	10	1-9	Possibly
Retail Bakery	Sixth & Ohio Sedalia, MO	Mr. Mallory	826-6920	Yes	20	K-9	Possibly
Rick's Body Shop	R. R. #2 Sedalia, MO	Mr. Rick Geer	826-1157	Yes	25-30	7-12	No
Rival Manufacturing Co.	16th & Lamine Sedalia, MO	Mr. Jim Houchen	826-6600	Yes	15	4-12	Yes

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Rival Manufacturing Co.	Miller's Park Plaza Sedalia, MO	Ms. Nyra Price	827-3860	No	0	0	Yes
Rose & Buckner	72 N. Jefferson Marshall, MO	Mr. Bob Rose	886-2002	Yes	15-20	7-12	Yes
Russell Brothers	Marshall, MO	Mr. Casey Kotowiez	886-7340	No	0	7-12	Yes
Russell Brothers	214 S. Ohio Sedalia, MO	Mr. Bob Johnson	826-5154	Yes	1-10	8-12	No
Scott's Jewelry	East Highway 7 Marshall, MO	Mr. Scott	438-5700	No	0	0	Possibly
Sears	110 W. Third Sedalia, MO	Mr. Finis Galloway	826-6500	Yes	10	7-12	Yes
Sedalia Computer Service	210 E. 7th Sedalia, MO	Mr. Larry McRoy	827-1990	Yes	10-15	9-12	Yes
Sedalia Democrat-Capital	700 S. Massachusetts Sedalia, MO	Mr. Don Keller	826-1000	Yes	15	K-16	No
Sedalia Implement Co.	2205 S. Limit Sedalia, MO	Mr. John Joy	826-0466	Yes	15-25	7-12	Yes
Sedalia Memorial Airport	East Highway 50 Sedalia, MO	Mr. James Addas	826-9796	Yes	Small	K-14	Possibly
Sedalia Police Department	3rd & Osage Sedalia, MO	Mr. Bill Miller	826-0214	Yes	10-15	1-14	Yes
Sedalia Water Department	111 W. Fourth Sedalia, MO	Mr. C. H. Taylor	826-1234	Yes	15	6-9	Possibly
Sheriff's Department	Warsaw, MO	Mr. Bob Breshears	438-5252	No	0	0	No

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Paul Shinn Oil Company	RFD 3 Warsaw, MO	Mr. Paul Shinn	438-5013	No	0	0	No
Sho-Me Stables	State Fair Grounds Sedalia, MO	Ms. Elaine Knight	827-2243	Yes	5-10	K-12	No
Sound Shop	1716 W. Ninth Sedalia, MO	Mr. Al Reese	827-2223	Yes	20	K-12	Yes
Southwestern Bell Telephone	220 E. 5th St. Sedalia, MO	Mr. Bob Johnson	826-9800	Yes	25	K-12	Yes
Sowers' Horses	Callis Stables Sedalia, MO	Ms. Susan Sowers	827-1778	Yes	5-10	8-12	Yes
Stan's TV	P.O. Box 856, Rt. 2 Warsaw, MO	Mr. Stan Johnson	438-6859	No	1	9-10	Yes
State Fair Community College	1900 Clarendon Road Sedalia, MO	Mr. Fred Davis	826-7100	Yes Check with Betty Blackwell	5-10	9-12	Yes
State Fair Riding Academy	Route 3 Sedalia, MO	Ms. Faith Lovell	826-9767	Yes	1-5	8-12	No
T & O Phosphate	Hughesville, MO	Mr. Larry Owen	826-1813	No	0	0	No
The Craft Shop	318 S. Ohio Sedalia, MO	Mrs. Boatman	827-3041	Yes	15-20	5-12	Possibly
The Dog House	116 W. 16th Sedalia, MO	Mr. Antoine	827-1941	Yes	1-10	8-12	No
Third National Bank	301 S. Ohio Sedalia, MO	Mr. Bob McDonald	826-0611	Yes	30-40	6-9	Possibly
Town and Country Shoes	201 N. Missouri Sedalia, MO	Mr. Charles Rayl Mr. Ken Grott	826-4490	Yes	Small	K-12	Yes

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Tullis Hall Dairy Co.	541 E. Fifth Sedalia, MO	Mr. Funnell	826-3030	Yes	10	3-12	No
Tygart & Arth Body Shop	207 E. Belle Marshall, MO	Mr. Ray Arth	886-3033	Yes	25	7-8	Yes
Unitog	Warsaw, MO	Mr. Osborne McMillen	438-5117	Yes	Arr.	7-12	No
Verl's Amoco Service	1801 W. Broadway Sedalia, MO	Mr. Verl Schnepf	827-0040	Yes	1-10	8-12	No
Veterinary	Cole Camp, MO	Dr. Taylor	668-4523	No	0	0	No
Viebrocks Welding	Cole Camp, MO	Mr. Harold Viebrock	668-3233	Yes			No
Vogue Styles	22 Jefferson Marshall, MO	Mrs. Howell	886-6161	No	0	7-12	Yes
W-K Chevrolet Garage	Cole Camp, MO	Mr. Vern Dean	668-4421	Yes	4-6	9-12	Possibly
Walker Publishing Co.	2016 W. Main Sedalia, MO	Mr. Mark Kitch	826-8200	Yes	15	5-12	Yes
Warren Grocery	Green Ridge, MO	Mr. Warren	527-3317	No	0	0	No
Warsaw Auto Supply	Warsaw, MO	Mr. Stan Intelman	438-7321	Yes	Small	1-14	No
Warsaw Sewing Center	Warsaw, MO	Mr. Jerome Kelly Mr. Donald Prunty	438-6919	Yes	6	8-12	Possibly
Warsaw Veterinary Clinic	Warsaw, MO	Dr. N. V. Roff	438-7333	Yes	8	8-12	Yes
WESCEMO, Inc.	651 E. 14th Sedalia, MO	Mr. Steve Laslo	827-3760	No	0	8-12	Yes
Western Auto	Jefferson & Morgan Marshall, MO	Mr. Gerald Leach	886-6813	No	0	7-12	No
Wilken Music	Thompson Hills Sedalia, MO	Mr. Wilken	826-9356	Yes	10	4-12	Yes

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Williams Press	Cole Camp, MO	Mr. George Williams	668-4418 547-3911	Yes	4-6	9-12	Possibly
Wilson's Company, Inc.	Box 340 Marshall, MO	Mr. Don Nutten	886-5522	Possibly	12	7-12	Possibly
Wood & Huston Bank	27 North Street Marshall, MO	Mr. Mitchell	886-5575	Yes	25	7-9	Yes
Yeager's Cycle Sales	3001 S. Limit Sedalia, MO	Mr. Rick Yeager	826-2925	Yes	1-15	8-12	No
Yost Chevrolet	Odell Avenue Marshall, MO	Mr. Ken Yost	886-3348	No	0	7-12	Yes